

COMPUTER WORLD

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Breach of Contract Charged

2 Customers File Suit Against IBM Unbundling

By Edward Brice

CW Staff Writer

Two IBM customers, a user and a leasing company, have filed separate suits charging that IBM's unbundling represents a breach of contract.

The user, Motor Replacement Co., of Phoenix, filed a \$5 billion class action Oct. 31 in Federal District Court, Phoenix. Greyhound Computer Corp. filed Oct. 28 in the Kane County, Ill., 16th Judicial Circuit Court, and seeks damages of \$100,000.

Motor Replacement charges IBM with rescinding a "lifetime" promise of free systems engi-

neering support for its 4400-series electronic accounting machine. If Motor Replacement is successful, all owners of IBM computers and business machines who purchased their machines for their own use prior to June 23, 1969, could share in any judgment.

Greyhound charges the manufacturer with unfair competition in establishing fees for software and services. Greyhound buys IBM computers and is committed, IBM says, to leasing them out at a "fixed percentage below IBM's lease rates." Greyhound contends that charging for sys-

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The Fall Joint Computer Conference and exhibits will be based in the Las Vegas Convention Center (top), with a second exhibition area located at the Sahara Hotel (above).

360 Firms to Exhibit Products

10,360 Hotel Rooms Booked for FJCC

CW West Coast Bureau
LAS VEGAS - The biggest, greatest, and most spectacular show in town will be the Fall Joint Computer Conference Nov. 18-20.

More than 10,360 rooms have already been booked through the conference housing bureau. The last time the conference met in Las Vegas, in 1965, the conference used less than 5,000 rooms.

There will be 360 exhibitors filling the convention center and overflowing into the Sahara Hotel convention facilities. A shuttle service will link the two centers.

The Spring Joint Computer Conference in Boston this year hit a record of 145 exhibitors. The FJCC will more than double this. There were 450 booths used in Boston and there will be 900 in Las Vegas. Cost of exhibit space is \$8/sq.ft. The previous cost has been \$6.

As an aid to visitors, an exhibit guide will be distributed for the first time at registration and handed out to exhibit walk-in visitors. It consists of a listing of all exhibitors with a brief description of what they will be demonstrating. It is also cross-indexed by type of equipment or

CW's coverage of the FJCC exhibits begins on page 28. It will be continued in next week's issue.

service so that a visitor can find those exhibiting the equipment or service in which he is most interested.

Conference registration is \$20 for members of societies affiliated with the American Federa-

tion of Information Processing Societies and \$30 for nonmembers. Registration to visit only the exhibit is \$5. Roughly 20,000 attendees are expected.

The conference committee has strongly urged all those planning to attend the conference to make their plane reservations now. The airlines are going to put on extra flights but they need advance information on the demand so that the flights can be scheduled.

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IBM Modifies Its SE Agreement

WHITE PLAINS, N.Y. - IBM, apparently in response to complaints from users [CW, Aug. 20], has clarified the wording of its Systems Engineering Services agreement to provide better protection of the customer's rights and data.

Clarification was made in two areas - the protection of data that a customer might classify as confidential, and the assignment of systems engineers (SEs).

What's Yours Is Yours

"IBM has modified sections of its Systems Engineering agreement primarily to state more

clearly the customer's rights to original written material and IBM's intentions and rights in assigning personnel," IBM said.

"The revised section on 'Rights and Data' states clearly that the customer has exclusive rights to all original material prepared for him under the agreement. It also states that data processing techniques developed under the agreement by IBM, or jointly by IBM and the customer, may be used by either party.

"Data processing inventions, discoveries, or improvements developed by the customer under the agreement are his property.

Rights to those developed by IBM personnel, while the property of IBM, are granted to the customer for a royalty-free license. If developed jointly, it is joint ownership.

"The agreement also states that IBM will make every effort to honor specific customer requests regarding SE assignments. However, it recognizes that SEs may perform similar work for others and states that the company reserves the right to reassign its employees.

"In addition, the agreement clarifies procedures established (Continued on Page 4)

UCC Ready to Seek Okay For Common Carrier Net

By Ronald A. Frank

CW Communications Editor

DALLAS, Texas - A proposed nationwide common carrier communications network "custom tailored for use by computer users" is being finalized for presentation to the Federal Communications Commission by Data Transmission Co., a wholly owned subsidiary of University Computing Co.

The Datran proposal comes only three months after the FCC ruled that Microwave Communications Inc. could establish the first link in what MCI has said will also be a nationwide communications network. MCI fought for six years to prove the necessity for non-Bell communications facilities.

Seymour Joffe, Datran president, said Datran's proposed facility will be a "nationwide switched network" which will include local loops in addition to longer distance trunk lines. Joffe told CW that the formal

network proposal will be filed with the FCC "before the end of the year." Although he declined to divulge specific technical details, Joffe did say that the all-digital transmission facilities would have an access time for the average computer user of "under three seconds."

Asked whether the network would rely strictly on microwave transmission, Joffe said that such methods as cable and satellite transmission were also being considered.

Although the proposed network will have strong ties with UCC, Datran officials have stated that the parent company will be just another customer if it decides to subscribe to the network when the system begins operations in about three years.

The exact relationship between the new network and computer services offered by UCC could become a crucial issue since the FCC warned last April that a computer company would not be permitted to enter the common carrier communications

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Simulation Indicates Public Housing Destroys Cities

WASHINGTON, D.C. — Public housing projects may be destroying the cities, according to computer studies by Dr. Jay W. Forrester.

Best known as the developer of the fertile core memory which sparked the growth of the computer industry in the early 1950s, Forrester is now a professor of management at MIT, where he is attempting to apply systems analysis to complex human systems.

Most recently, Forrester has developed a computer model of a city in which industrialization, housing availability, and population are the principal factors determining economic health and the general quality of life. He can select various policies controlling these factors and the computer will project their effects over a 50-year period.

Too Much Housing in Slums

His conclusion is that slum areas contain too much housing and too few jobs, and that building public housing makes things worse. On the other hand, if slum housing is replaced by industry, the balance is redressed and the remaining slum housing is soon replaced by private housing needed by employees of the new industry. "Public housing is a mistake in depressed areas and not very useful elsewhere," he declared.

Forrester reported this controversial theory at a symposium of the National Academy of Engineering here Oct. 22.

Unlike others at MIT, particularly those working on Project Cambridge (CW, Oct. 22), Forrester does not use interactive modeling. This means that once he sets up the policies to be tested, the computer projects the progress of the city for the next 50 years without any other input. Such a run takes about two minutes of computer time, he said.

With interactive modeling, the computer might be set to project the progress of the city for, say, five years. Then the scientist would consider the results, make new decisions, and the computer would project another five years, and so on for the 50 years.

"I am interested in the effects of policies, not decisions," he explained. So he allows the policies to be carried out unchanged

for the 50-year test without modification.

Critics charge that this sort of modeling is unrealistic, and that Forrester's model is too simplistic to be valid. But Forrester argued that his model is better than the one normally used, "the simple model you carry around in your head."

Critics also charge that one of his conclusions has been shown in practice to be invalid, which throws doubt on the model. Forrester says that if slum housing is replaced by industry, the

area is economically upgraded and there will be a housing shortage. But he also says that this housing shortage does not drive out the existing low income population.

Critics argue that Cambridge, Mass., home of MIT, is a counter-example. Little public housing has been built there, and MIT and Harvard have replaced housing with industry. Yet the result has been skyrocketing rents which have forced out the low income population.

in one 50-year test, Forrester instituted a hypothetical housing program which produced low-cost public housing for 2.5% of the underemployed population each year. "As housing becomes more available, jobs become scarce," he said. "The stagnating urban area has become a social trap. Excess housing beckons people from other areas and causes inward migration until the rising population drives down the standard of living far enough to stop the population inflow."

II. On the other hand, slum

housing is replaced at 5% annually by "high-employment industry" and unsubsidized (except for tax credits) housing for workers and executives, "the result is a cascading of mutual interactions which raise the economic activity of the area, increase the upward economic mobility for the underemployed population, and shift the population internally from the underemployed to the labor class. This is done without driving the existing low-income population out of the area."

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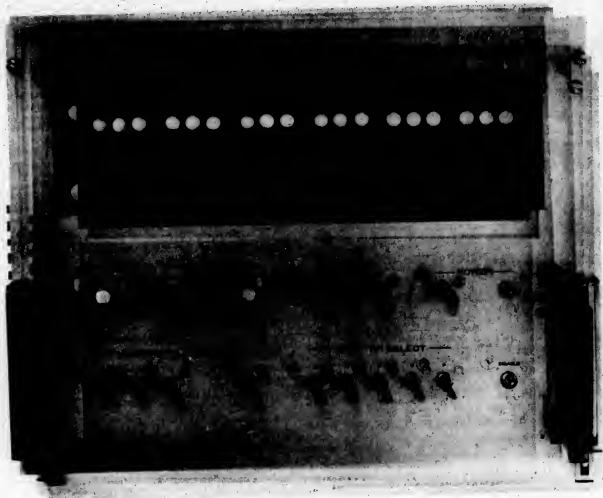
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168,000 Graduates in 1969?

Survey Indicates Need for Study of Private Schools

By a CW Staff Writer
MONTVALE, N.J. — A preliminary study conducted by the American Federation of Information Processing Societies (AFIPS) shows that on a nationwide basis, private EDP schools may be turning out, in pure numbers, enough programming graduates to meet projected national needs.

The study, conducted as part of AFIPS' general statistical research program, was based on the results of questionnaires sent to a total of 194 schools, of

which 41, or 21.1% responded. Their figures showed that they expect to produce about 15,000 graduates during 1969 in the following categories: programmers, 7,990; computer operators, 1,450; keypunch operators, 4,360; others, 1,200.

Private EDP schools, a conservative number based on a recent compilation of such institutions in the U.S., 1969 EDP graduates would total more than 168,000.

AFIPS officials view these figures as significant in light of

recent U.S. Department of Labor projections indicating annual employment increases of about 50,000 each in programming, systems analysis, and computer operators.

Dr. Bruce Gilchrist, AFIPS executive director, while conceding the limited scope of the survey and the difficulty of assessing its validity, noted that the results indicated a clear need for additional research.

"The need for a major national study is indicated by the apparently large number of annual

EDP school graduates, the great variation in the length of courses offered [between 250 and 1,100 hours], and the indicated transitory nature of a number of schools," he said.

Thorough follow-up studies are called for, Gilchrist believes, in the areas of:

- Total EDP school enrollment, by type of course.
- Percentage of EDP school graduates, total and by type of original training, currently em-

ployed in various capacities in information processing.

- Current and projected industry minimum requirements for entry-level positions in information processing.

- Projected industry programmer hiring policies in the event of an increased supply of college-trained programmers.

The pilot study was conducted among private EDP schools in Baltimore, Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, St. Louis, and Washington, D.C.

User, Leasing Firm Sue IBM for Breach of Contract

(Continued from Page 1)
tems engineering will put it out of business.

In separate statements, IBM denied every having offered "systems, engineering services 'for the life of the machine,'" as alleged by both plaintiffs.

An IBM spokesman added, "The services which IBM now offers for a charge have historically been a part of IBM's marketing effort to assist in the installation of equipment. To make it easier for users of IBM equipment to adjust to these policies," the company "went substantially beyond any obligation" and "will provide all mutually planned support in users without charge" during a "transition period" until Dec. 31, 1969, he said.

During this transition period, Motor Replacement said, companies are expected to hire or assign personnel to be trained in systems engineering services, so

as to lessen the cost of purchasing new services after the first of the year. IBM has demanded that this training will be on a one-to-one basis, that is, one person from the customer for each "instrument" from IBM, a Motor Replacement spokesman said.

Everett Warner, president of Motor Replacement, said the suit was filed after meetings with IBM failed to bring an "acceptable" agreement on the new unbundling policy.

Warner said that much of IBM's documentation had been "poor" and, in some cases, was not provided at all. He also claimed that IBM had not updated a payroll application, which eventually would warrant technical assistance. This would cost Motor Replacement in manpower during the transition period, and directly in dollars after the first of the year, he said. Motor Replacement purchased

its first 6400 five years ago from IBM and a second machine last year on the open market. After the latter purchase, the company said it was informed that IBM admitted programming obligations for the first machine, but not for the second. Motor Replacement's suit is based on this admission which, according to Warner, was both verbal and written.

In addition to protesting unbundling itself, Greyhound ob-

jects to IBM's 3% lease reduction which was announced in conjunction with unbundling [CW, July 21]. The leasing company charges the manufacturer with setting rates so low that neither it (IBM) nor other leasing companies could recover costs. "During the remaining life span and such rates have been set below cost in order to destroy competition..."

IBM replied that, if there were

a financial or business effect on Greyhound, "it would have to result from Greyhound's commitments to its customers."

A charge that IBM had monopolized the computer manufacturing market was dismissed by the company as "qually without merit." The spokesman added that the "dynamic growth of the data processing industry and its competitive nature are well-documented."

Digital Transmission Planned

UCC to Seek FCC Approval of Network

(Continued from Page 1)
field until the FCC's present computer inquiry is completed.

The question of whether a computer company should be more involved in data communications has raised conflicting opinions. In the case of MCI and its FCC filing to provide microwave links, John Goeken, MCI president, stressed that his firm would provide data facilities both for computer users and others requiring communications facilities. In addition, MCI has stressed that it will not accept financial backing from sources connected with either the computer or communications communities. MCI classes itself strictly as a common carrier with no company affiliations.

In October of last year, UCC created a subsidiary, Microwave Transmission Corp., to implement its announced goal of setting up its own common carrier. According to UCC, MTC now is a subsidiary of Datan.

System Planning began two years ago, Joffe said, and UCC is now convinced that a separate private common carrier data network will provide the most feasible solution to problems facing computer data users. Last year, UCC negotiated unsuccessfully with Western Union and other firms to acquire existing communications facilities, but the firm is now committed to the proposed network concept, Joffe said.

The Datan system as proposed would include 255 microwave stations and 10 district switching offices, initially providing common carrier services in 36 major metropolitan areas. The network would transmit digital information directly, thus eliminating

the need for the data modems now required by the communications facilities of the Bell System.

Asked how the proposed network would compare with the microwave facilities being planned by Microwave Communications Inc., Joffe said that the Datan network would be more than just a common carrier facility.

"We will provide future services that could allow computer users the capability of code and speech conversions as part of our network," he said. In explanation, Joffe added that data originally transmitted in binary coded decimal format could conceivably be converted to ASCII or other code formats by auto-

matic converters in the Datan network. He added, however, that this type of conversion capability would not be part of the initial services provided.

In discussing the proposed network, one knowledgeable source said that the all-digital transmission methods should significantly reduce the error rates encountered by computer users on the Bell switched message network. The elimination of data modems would provide hardware savings for users who would be able to interconnect directly with the Datan net. The high speed electronic switching proposed for the network would also reduce total transmission times, according to the source.

IBM Modifies New SE Agreement To Clarify Rights of Customers

(Continued from Page 1)
by IBM to protect information which the customer designates as confidential."

This policy clarification is reinforced, the company says, by a highly stringent procedure for determining and maintaining customer-confidential data. These procedures are available for inspection, upon request, the

company stated.

CDC Takes Opposite Stand

Control Data is still maintaining its stand that all development work done by customers on its machines is theirs by right, available for use by CDC. This has, according to several CDC customers, "created some very tough situations."



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Catastrophe Prevention Briefing Planned by AMA

NEW YORK — The prevention of a major catastrophe in a computer installation will be discussed at a special American Management Association briefing session Nov. 17-19.

Designed to cover a wide variety of potential disasters, whether physical or through inadequate security precautions, the session is aimed at the prevention of a collapse that "could wipe out the company when it wanes out the computer."

Fire, power failure, theft, fraud, vandalism, program loss, and sabotage are among the topics to be covered. The methods EDP managers have used to cope with these problems will be fully discussed to make it possible for

other executives to benefit from their experiences.

Titled "Catastrophe Prevention and Security Management of the Computer Complex," the session is aimed at all levels of management at the computer installation. It will be conducted by EDP experts with wide experience in security procedures and internal control programs.

Full fee for the three-day briefing is \$200 for AMA members and \$335 for nonmembers. The fee, payable in advance, includes the cost of all luncheons and meeting materials. The briefing will be held at the Americana Hotel.

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Computer Aids Research Into 'Rational' Speed Limits

BLOOMINGTON, Ind.—Take a series of traffic sensors imbedded in city streets here, connect them by telephone lines to a computer, and what do you get?

If you're willing to wait a while, you'll get what researchers call "rational" speed limits on the nation's highways.

The IBM computer is located in the research division of the Department of Police Administration at the University of Indiana.

The sensors, RCA traffic detectors, are located at strategic points in Indiana Rte. 37, north and south of Bloomington. Portable sensor units are placed on Bloomington city streets and on Monroe County roads.

The collection and analysis of data is part of a 17-month study

being conducted under a \$250,000 grant from the National Highway Safety Bureau of the U.S. Department of Transportation.

Prof. Kent B. Joselyn, department research director, said the information would be utilized to develop methodology which might be used throughout the nation to establish "optimum" speed limits.

These are the so-called "best" speed limits fitting a given roadway when considered in terms of traffic, flow, pace, and volume, and road geometrics, driver behavior, and public safety.

Most states and municipalities currently set speed limits through these means: Arbitrary selection, political or constituent pressure, or traffic engineering—the simple counting of

traffic, observation of traffic pace, and average test run speeds, and then relating these factors to an arbitrary "85th percentile."

According to Joselyn, "Little relationship is found between such means and sound scientific methodology." His department hopes to develop a theory for the National Highway Safety Bureau by which speed limits might be more rationally selected. Joselyn said the project is amassing a much larger, much more valid data base than has ever before been possible, since the human factor has been eliminated from the collection process.

"The computer doesn't take a coffee break, it records high or low traffic volume equally well," he said.

And, he noted, use of the concealed sensors has prevented changes or alterations in traffic flow behavior; a problem encountered in the use of visible controllers, such as radar or policemen in cruises.

The sensors are placed in groups of four, two in each lane. When a vehicle passes over them, it breaks a magnetic field, with signals being relayed to a detection unit at the side of the road and transmitted via telephone line back to the computer on campus.

Two coded words are produced by the computer. When interpreted by research engineers, the words tell the speed, time of day, weather, interval between vehicles, and whether the vehicle is passing, straddling the center line, or wandering back and forth.

By relating a series of messages, Joselyn said, the engineers can

determine traffic volume and pace, identify and separate truck and auto traffic.

Joselyn said the system for speed measurement is quite accurate. About 90% of the time it records speeds within one mile an hour of actual speed, he said. The project staff will report to the National Highway Safety Bureau about a year from now.

Computer Price Cut

NEWPORT BEACH, Calif. — A 38% price reduction has been made on Computer Automation's Model 216 general purpose mini-computer — from \$12,890 to \$7,990.

The 2.6 msec. 16-bit Model 216 is designed for communication and terminal systems, process monitoring and control, automatic test and inspection systems, numeric control systems, and on-line data acquisitions.

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Remote, Numeric, Medium-Speed Terminals Offered

Among the recently announced terminals are a portable numeric data-entry device, a remote data-entry terminal, and an IBM 2700-compatible device. Applications of the terminals range from remote batch processing, accounting, and inventory control to training programmers and solving math problems.

Medium-Speed Terminal

GARLAND, TEXAS—A medium-speed data communications terminal that is compatible with the IBM 2700 series of communications controllers has been developed by Remcom Systems Inc.

Applications of the Remcom 2780 terminal include remote batch, remote job entry, and others requiring data transmission over common carrier or private communication lines.

This new automation solution can reduce your operating costs and increase the yield of better quality products. It's a whole new 4th generation product line... we call it System 18/30.

System 18/30 is a family of compatible GA automation computers designed to work in distributed management information and control systems. The GA worker-level computers permit the user to automate at the primary control loop first, with predictable results and costs—and then add to these automation functions GA supervisory-level computers for total process optimization.

Complete compatibility is maintained with OS/360 and DOS/360, the company claims. The basic Remcom 2780 is a self-contained, free-standing terminal consisting of a line printer, card reader, control electronics, and a communications line interface all packaged in a single cabinet.



Three versions in different printer speeds are available. The 150 line/min with 150 card/min reader version is priced at

New Products

\$17,500; the 300 line/min with 300 card/min reader at \$22,500; the 600 line/min with 300 card/min reader at \$30,500. Leases are available on a three- or five-year plan. Lease prices range from \$525/month to \$1,200/month, depending on capacity.

Deliveries will start in January, or 60 days after receipt of order, the company says.

Remcom Systems, Inc. is located at 2705 National Drive.

Remote Terminal

WELLESLEY HILLS, Mass.—A remote terminal for punched card data entry to a central

heart of our new System 18/30 is the 1804 processor, which is software compatible at the binary code level with the IBM 1800 and 1130 computers and will work with or extend existing IBM 1800 installations... and do the work more effectively and at a lower cost.

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grams can be accomplished quickly, economically, and on a fixed price basis.

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computer and printed or punched card output is available in four models.

Honeywell's electronic data processing division is offering the Series 2440 remote transmission terminal, which it says may be used by large universities for training programmers, for remote payroll preparation, for remote billing and invoicing, for solving complex design and math problems by scientists and engineers, and for generating management reports.

A company spokesman said that the terminal is "specifically designed for computer users that transmit large volumes of punched card data from a remote site to a centrally located computer, and requires as output, either printed reports or additional punched cards."

The Series 2440 terminal reads punched cards at the rate of 400 card/min, transmits data over standard communications lines at 250 to 300 char/sec, punches cards at 100-400/min, and prints reports at 300 line/min, according to the company.

Standard features include two 200-character memories, polling/selection or contention mode of operation, automatic answering and automatic blocking, 120 print positions on the line printer, horizontal and vertical tabulation on the printer, and selective card field reading on the card reader.

The four available models are: 2441 terminal for punched card input with line printer output; 2442 terminal for punched card input, punched card or line printer output; 2443 terminal for line printer output only; and 2444 for punched card input and punched card output.

First deliveries are scheduled for the first quarter of 1970. Prices range from \$675/month on a five-year contract for the 2444 terminal to \$1,055/month on a five-year contract for the 2442 terminal. Purchase prices range from \$30,660 to \$48,090. Honeywell is located at 60 Walnut Street here.

Numeric Terminals

HOUSTON—Two numeric data-entry terminals that record data on 1/4-inch tape and transmit data using self-contained acoustic telephone couplers are being offered by Applied Peripheral Systems, Inc. The DG-3 has its own numeric display and keyboard, while the DG-4 uses a 10-key adding machine for input and hard-copy printout.

The DG-4 adding machine data-entry terminal stores numbers as entered in memory and records on a cassette when one of the adding machine function keys is pressed. Data accumulated on magnetic tape is played back by telephone to a computer or data collection center.

The DG-4 has a self-contained acoustic coupler and modem, compatible with 103-type data sets. ASCII-coded characters are transmitted in teletypewriter format, at teletypewriter speeds, using a standard telephone, according to the company.

From the DG-3 keyboard, up to twelve successive characters can be stored in memory and immediately displayed in a lighted Nixie display. Errors may be corrected with both terminals. The DG-3 may be taken to a job site for keying in data.

Both terminals are priced at \$1,850, with delivery scheduled for December.

Applied Peripheral Systems, Inc. is located at 7120 Harwin St.

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DG-4 Terminal

Why EDP Costs So Much

Why EDP Training?

While training cannot guarantee successful EDP performance, it is absolutely certain that no successful installation can exist without them.

We have all heard and read about the supposed inefficiency of computer operations. Much of this is exaggeration and self-serving. And yet, like it or not, there is still considerable substance to these charges. Studies have shown that many installations are not the world-beaters they are supposed to be. Quantitatively, many have not returned a decent percentage on investment and, qualitatively, many have not been as productive as hoped.

Complicating the problem is the arrival of third generation hardware with its faster, multi-processing, remote-site I/O operations—all generating the need for more highly sophisticated programs to take advantage of the new equipment.

This inevitably brings into sharp focus the need for equally sophisticated managers, analysts and programmers.

Here is where Brandon Systems Institute can help you or your organization. The Institute offers a full range of courses in EDP operation and control for programming, design, operating, and management personnel. Specific job titles covered are junior and senior levels of operators, programmers, systems analysts, operating managers, and corporate executives.

Career Path Planning

Back to the Brandon approach is Career Path Planning. This is our concept of training which results in an organized, self-paced, desirable results for students. Each course is a self-contained unit, but so constructed that it can be easily linked with another at a higher level. Because of this modularity, a mix, best suited to the need of individual organizations, can be constructed. Brandon representatives will be pleased to offer you guidance in this area.

Course quality standards of the Institute are established and maintained at an extremely high level. We update courses at least every six months to assure their timeliness. At frequent intervals, courses are audited by Brandon examiners, and review sessions are conducted with clients. Additionally, new courses reflecting the latest in EDP methods and practices, are introduced at the rate of approximately four per year.

Why the Brandon Approach Works

In the experience of the Institute, it has been found that a permanent, full-time training staff does not always produce the best results for students and their respective organizations. In the fast-changing field of EDP, knowledge and

expertise may very quickly become obsolete. Accordingly, the Institute employs the services of the senior staff of Brandon Technical Services as instructors and lecturers. These practicing consultants, by virtue of their extremely diversified experience in practically every phase of EDP, are able to bring to you the very latest EDP methodology and practices.

Employee Turnover

Any organization with a well thought out plan for employee training is certainly going to go a long way toward overcoming the problem of excessive employee turnover. In a fast growing, sometimes chaotic industry such as EDP, personnel stability cannot logically be expected. Some organizations, instead of merely bemoaning this, have reacted with more appropriate personnel policies—including a good training program.

Private Courses

Private, in-house to companies and organizations, these courses are held specifically for the employees of a single organization at a time and place preferred by the client. For maximum results, class size should be limited to from 10-15 students.

Student course material is in the form of an extensive syllabus which spells out major and minor subject matter and contains exhibits, charts, and work forms. At course conclusion, this becomes part of student's personal reference library.

Regional sessions are conducted for students from several companies or organizations having common interests in problems, or equipment. Seminars are held at locations convenient to sponsoring organizations.

"Go Public"

Public courses are held regularly in major cities in the United States, Canada, Europe and Australia. The courses—lectures, seminars, and workshops—are a direct, practical means for gaining useful and up-to-date knowledge in both technical "how to do it" topics and non-technical "What you should do" topics.

The Institute's public courses present a unique opportunity for individuals, on their own initiative or under the sponsorship of their employer, to receive training that will enable them to better meet the challenges of their current positions and to prepare for career advancement.

We schedule the courses in such a manner as to present a logical training series. They are usually presented in meeting rooms or seminar facilities provided by business-district hotels. Locations are selected for their convenience to public transportation. Lunches are provided. Courses are presented during a normal working day.

Consulting the Answer?

As an actively separate from actual training, we can provide consulting services into the educational needs and problems of organizations. Intensive Career Path Planning analysis determines areas of present and future needs. Personnel to be trained, subject matter to be covered, and the establishment of standards to evaluate results. Recommendations are specific. They range from extensive programs to spot training to no training at all. The last, an "educational clean bill of health" would indicate an adequately trained staff with formal procedures for growth and replacement of staff due to normal attrition.

For Corporate Executives

A considerable amount of managerial difficulty stems from a general lack of understanding of EDP activities. Data processing professionals have contributed much to this breakdown of communication by using jargon and over-complicating essentially simple concepts, especially those in the handling of business transactions.

Designed to eliminate some of the mystery of EDP, this course explains the functions of computer systems, the application of computers to business, and the roles of computers and systems on the responsibilities of corporate executives. Additionally, methods of more effective communication between executive management and computer personnel are presented.

"Executive's Guide to Data Processing"—Two Days.

For Non-Technical Users

Do you know the best way to ask for services from your company's computer installation? Have you done your share of defining the problem you want solved? Do you understand what systems will do? How can you get the EDP services you want?

This two-day lecture course answers these questions in non-technical language. It describes the fundamentals of data processing systems and highlights the necessary advisory and control functions for management using computers. Methods of getting better quality work without specified time limits are shown.

"User's Guide to Systems Development"—Two Days.

For Financial Staff

Auditors, accountants, and financial control personnel who perform or supervise audit activities involving EDP will find this course extremely useful.

"This course shows how the auditor (1) applies

internal controls, (2) designs independent audit systems, (3) analyzes data documentation, and (4) evaluates data processing performance. Outlined are audit trails for EDP systems, security techniques to safeguard against corporate losses and misuse of EDP resources.

"Auditor's Role in Data Processing"—Two Days.

For Technical Management

How can departmental efficiency be increased? How can better techniques of systems analysis, programming and operation be installed and utilized? How can performance of data processing activities be measured? What about budgets, personnel?

New insights to these and other questions are given in several courses and workshops for EDP managers. The aim is to provide a viewpoint for improving overall departmental efficiency. The causes of common problems are discussed and methods of reducing them through performance standards are outlined.

"Project Control Workshop"—Three Days.
"Computer Systems Analysis Techniques"—Two Days.
"Management Standards"—Two Days.
"Computer Operations Management Systems"—Three Days.
"Data Base Organization and Management"—Two Days.
"Documentation Standards"—One Day.

For Systems Analysts

These Brandon courses, for both beginning and senior personnel, examine time-proven as well as new methods in the areas of systems analysis and design.

The courses deal with the systems process, stressing the interrelationships that exist with regard to problem analysis, documentation, job responsibility, and show specific techniques that can be applied to make the process more efficient. Additionally, organizational concepts are presented to provide better control over the development effort in dealing with users and management.

Basic Business Systems Analysis—I—five days.
Basic Business Systems Analysis—II—9-15 days.
Problem Analysis for Information Systems—five days.
Decision Tables, Principles & Applications—two days.
Data Base Management Workshop—five days.
Project Control Workshop—three days.
Documentation Standards—one day.
Data Collection—three days.

For Programmers

Today's programming problems are essentially two-fold. First, to improve the efficiency of standard and even routine programming jobs, and secondly, to increase programmer competence for the newer and more complex requirements of businesses and organizations.

This workshop greatly compresses the same necessary to attain this competence. Taught are techniques and methods that otherwise could only be acquired from many years of "on-the-job" training.

"Programming Techniques for Improved Performance"—Five Days.

Start your attack on rising EDP costs now. Send for free information.

Who We Are

Brandon Systems Institute is an educational and training organization specializing in electronic data processing. We conduct programs of professional development for business, government, and institutions—large and small—in the United States and abroad. Courses are offered for all levels of EDP operation and control as well as for executive management.

The management sessions offer modern, jargon-free and practical methods for planning and controlling data processing systems and organizations. Technical sessions present the latest techniques in systems analysis, design, and programming. Brandon Systems Institute is the largest

non-manufacturer-affiliated organization offering EDP education and training.

Annually, we conduct 20-25 different courses for more than 7,000 students.

Since our founding in 1965, we have trained over 25,000 students in the United States and abroad.

The Institute is a subsidiary of Brandon Applied Systems, Inc., an international management and technical consulting firm which operates in the areas of electronic data processing and information handling. Other subsidiaries provide services in programming and proprietary software, service bureau facilities, market research and planning, and publishing and printing.

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Editorials

Educating the News Media-II

After the TRW Systems Group gave the first of its series of free seminars on computers for representatives of the news media, one TV reporter told a CW staff member: "They spent three hours telling us nothing really but what a computer is. All we need to know is that it reduces data."

This man had just heard Robert B. Muchmore, vice-president and general manager of TRW's software and information systems division, state that by the year 2000 the computer industry would equal or surpass the auto industry, now the nation's largest industry.

Granted most of the attendees told our staff member that they had found the seminar highly interesting and valuable, we still suspect the TV reporter's reaction was all too typical of the news media. Only about 30 people attended the first session, a relatively small group.

This situation throws the responsibility for accurate news reporting back on the computer community. We must, in dealing with the news media, be sure that we make the facts clear so that we don't wake up to hear or read: "The programming computers at James Monroe High School in Sepulveda have blown their mechanical minds." (Quote from *The News*, Van Nuys, Calif.)

Protection for Whom?

The Proxmire Fair Credit Reporting Act appears to be the worst possible type of bill, the kind that, once passed, implies that real safeguards exist and therefore everyone can relax and forget about the problem.

But the act says, in effect, that you are guilty until proven innocent and that requests for changes in credit bureau records can be rejected as "frivolous or irrelevant."

Why should computer people care about this issue? Because they aren't affected by the "computer mystique." They know the rule "garbage in, garbage out."

They know that once an error gets into a system it can lurk there forever, and that therefore there must be adequate channels of appeal.

The handling of errors in computerized billing systems already has brought condemnation and legislation.

Let's not repeat this situation with computerized credit reporting. Let's push for adequate legislation now.



Letters to the Editor

Data Network User Rebuts CE's Defense of SDS Staff

As a customer of Data Network's SDS 940 time-sharing service, I feel obligated to answer Mr. Williams [CW, Oct. 8].

First, I think that your prejudiced defense of SDS's CE staff was emotionally heartwarming, but logically inadequate and incompetent. Feeding 2.7 children (which, Mr. Williams, come in whole numbers like integer constants), may, in your company, depend on "efficient customer service." I assume that by "efficient" you refer to your CE's ability to quickly solve customer problems (well, I am sure, they have had ample opportunity to test their skills judging from the 940 reliability). This, however, may be part of your problem. Maybe it should also depend on how often they must solve customer problems.

Secondly, I suggest that you ask your "aces" why SDS could not implement floating point hardware on Data Network's 940 (after trying for nine months).

Finally, I would like to add:

1. If your managers act upon reports assembled by the 940 (I assume SDS is computerized and uses the 940; if not, why?) then I understand their delay.

2. I agree with your statement that "we should be paid like any other business, when we provide a service." Well qualified don't you think?

3. Due to "efficient" CE support, SDS exchanged Data Network's second 940 for the first. Yes, they gave that one back, too! But, don't you think about those two, think about the third machine you did not place, but GE did.

James P. Salvant
District Manager

Com-Tel Network Inc.
New Orleans, La.

But Data Network Takes More Moderate View

Mr. Williams of XDS, formerly SDS, has to our knowledge never worked with the CEs in New York. SDS New York CEs surely do not average nine years [of] experience, our site reports were never acted upon, and their turnover was quite extensive. Our complaint was not an indictment of SDS in general, but of SDS in New York.

Had SDS provided the service, perhaps they would have been paid.

Leonard DeShields
Manager Operations

Data Network Corp.
New York

ACM Meeting Not Planned As Debate, Chairman Says

The N.Y. City Chapter of ACM was pleased to have Dr. Grosch as its guest speaker recently. Your report of that meeting [CW, Oct. 8] contained an error which should be corrected. It was not scheduled to be a debate between Dr. Grosch and a member from Congressman Gallagher's staff. It was in fact to be a lecture by Dr. Grosch with an invited member of the congressman's staff in attendance in the audience.

Glen Holtkamp
Program Chairman

N.Y.C. ACM

Standard Sets Record Straight On Sales, Origin of Concept

We appreciate the article on Standard Computer Corp. which appeared on Page 41 of your Oct. 8 issue. However, there are several statements in the article which are not entirely accurate and should be corrected.

Several erroneous numbers were given as sales figures for Standard's various types of systems. The correct numbers as to systems delivered on sale or lease are as follows: 7 IC6000 systems (of which 2 have been returned as termination of lease), 6 IC4000 systems with orders for 3 additional systems, and 2 IC7000 systems with orders for 3 additional systems and one customer having the option to order an additional 5 systems.

Your article indicated that two of the company's founders, Laszlo Rakoczi and David Keefe "took their microprogramming concept to General Electric and, when it was rejected, decided to form their own company." The fact is that Mr. Rakoczi and Mr. Keefe left General Electric Co. to form an independent consulting firm in 1964. It was not until some six months later, in March of 1965, that Standard Computer Corp. was formed. The IC6000, the company's first system, was developed as a result of work by Mr. Rakoczi, Mr. Keefe, and others after the formation of Standard. No part of the test system design was taken to or "rejected" by General Electric Co.

I know that you will understand our concern to set the record straight on these inadvertent errors in an otherwise fine article.

W.W. Ottenson
Vice President
Field Operations

Standard Computer Corp.
Santa Ana, Calif.

ask the man who rents one



Get the lowdown on Adpac from a man who pays to use it. The list grows every day and reads like a Who's Who of American business. Anyone on it will gladly tell you what he's accomplishing with this new programming language. And frankly, it's more convincing when a user says that he's writing programs two to three times faster. Or that program maintenance is twice as easy. Or that programmers learn Adpac in half the time. For a copy of a current Adpac users list, telephone (415) 981-2710, or write, Adpac Computing Languages Corporation, 101 Howard Street, San Francisco, California 94105.

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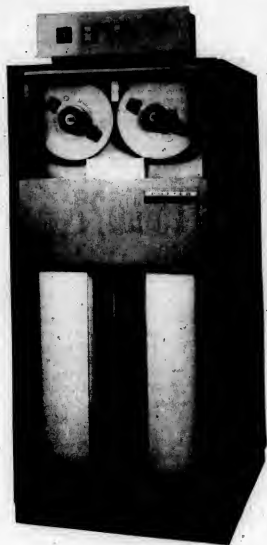
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 **POTTER**
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Consumer Must Prove His Innocence Under New Bill

WASHINGTON, D.C. — Credit bureau errors could be corrected, but the burden of making the change would be on the victim of the error, under Sen. William Proxmire's Fair Credit Reporting bill.

Such legislation has gained new importance as credit bureaus begin to computerize their files. Experience with computerized billing systems indicates that it is harder for a consumer to get a computer-related error corrected.

The bill has been approved by the Senate Banking and Currency Committee and passed on to the full Senate, but there is no indication when it will be taken up there.

Another provision of the bill would sharply curtail secret in-

When Bernard Wilkoff applied for a family major medical insurance policy in 1958, the insurance company said that it would be happy to insure him and his three children, but not his wife. Other insurance companies said the same thing, and all refused to give a reason.

Through a friend in the insurance business, Wilkoff said he found that Retail Credit Corp. had a file on his wife which said she was an alcoholic. Wilkoff told the Proxmire committee, "She doesn't drink five drinks of liquor in a year." Nevertheless, Wilkoff said, no major insurance company will cover her, even the Pennsylvania state insurance commissioner could not help.

Forty-five million Americans, practically everyone who has applied for insurance, have dossiers on file with Retail Credit Corp. of Atlanta. The company has little to do with credit, but does have 7,000 investigators compiling insurance and employ-

ment and employment investigations. Finally, the bill would virtually exempt credit bureaus from lawsuits.

Originally proposed by Proxmire to regulate credit bureaus, the bill now covers a wide area of "consumer reports," which includes any written or oral report which aids in establishing a

person's eligibility for credit, insurance, or employment.

The strongest provisions of the bill cover "investigative consumer reports," defined as reports in which "information on the consumer's character, general reputation, personal characteristics, or mode of living is obtained through personal interviews." Such reports are usually used for insurance or employment, and are usually secret. Credit reports are specifically excluded from the restrictions on investigative reports.

Under the proposed law, anyone who ordered an "investigative consumer report" would have to disclose that fact, in writing, to the consumer who then would have the right to request disclosure of the nature and scope of the investigation. Furthermore, no reports could be based on investigations over three months old unless the facts were rechecked.

Other provisions of the bill include:

□ Consumer reporting agencies must disclose, on request, the contents of a consumer's file, sources of some classes of information, and recipients of reports during the past six months (two years for employment reports).

□ Anyone who rejects a consumer for insurance, employment, or credit, or who charges a higher rate for insurance or credit, based on a consumer report, must supply the consumer with the name and address of the reporting agency, but only if the consumer asks for it.

□ If a consumer disputes the completeness or accuracy of any item, and the dispute is not "frivolous or irrelevant," the consumer reporting agency must re-investigate, inaccurate or unverifiable information must be deleted from the file, or addition of an explanatory statement, the consumer reporting agency must send notification to everyone who has received a report in the last six months (two years for employment reports).

□ Most items must be deleted from files after seven years.

□ Reporting agencies cannot report adverse public record (court) information unless that information is kept up to date, or the consumer is told each time a report is made.

□ Government agencies, such as the FBI, would be prevented from going on "fishing expeditions" through files without a court order.

One Man's Fight to Change the Record

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read it in our
free show wrap-up

Computer Research Bureau, the only advisor on the computer industry to the financial community, is making a special FJCC offer... a complete wrap-up of the show... what was new... what was significant... and what its probable impact will be on the growth of the computer industry and on the individual companies. It will be a limited issue, off the press about five days after the show, so drop by our booth and sign up for your free copy or complete the coupon below.

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And that's not the only thing you can get from CRB during the show. We'll have the first and only complete World Directory of Computer Companies with detailed information on over 5,000 companies in the computer field, with more than 700 reference-packed pages in its 1970 Winter Edition. To give you the information you need, when you need it. During the show, the price will be \$18... after the show \$22, so take advantage of this special show offer.



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Push-Button Tickets Slated for Trial Run

LOS GATOS, Calif. — An experimental automatic ticket vendor (ATV), a passenger operated, computer-based device which accepts a credit card and issues a complete airline ticket in less than a minute, will be tested next year at Chicago's O'Hare International Airport.

Two automatic ticket vendors will be installed in the ticket counter at American Airlines for the three-month test scheduled to begin in mid-January.

Each IBM ticket vendor will accept new magnetically encoded credit cards issued by American Express and American Airlines to selected passengers who fly frequently out of Chicago.

The purpose of the test is to determine if self-service machines can speed passengers through the airport, permitting the ticket salesman to spend more time with those who require personal attention.

A passenger who has made an advance reservation with American Airlines has only to insert his credit card into a vendor and press the "yes" button next to the question, "Do you have a reservation?" When he removes the credit card, he receives his ticket.

A passenger without a reservation can use the vendor to reserve either first-class or coach accommodation on the next available flight, to any of the following 11 destinations: Boston; Dallas-Fort Worth; Detroit; Indianapolis; Los Angeles; New York-LaGuardia; New York-Newark; New York (no airport preference); St. Louis; San Francisco; and Washington, D.C.

Passenger Procedure

As the passenger stands in front of the automatic ticket vendor, he is quickly guided through the necessary steps to purchase a ticket by a series of computer-controlled lighted instructions that are sequentially illuminated.

During the few seconds it takes for the machine to encode, print, and bond the ticket, the instruction "Please wait for ticket" is displayed.

The major components of the Automatic Ticket Vendor are: a display panel, a credit card reader, and a ticket issuer. The ATV also contains its own supporting electronic logic and power supplies.

Tickets issued by the ATV consist of one or more flight coupons bonded together in book form with a passenger receipt coupon. Each coupon is the size and shape of a standard tabulating card, plus a small bonding stub. The bonding strip is coated with a pressure and heat sensitive adhesive.

The ticket issuer encodes and checks data on the magnetic track across the back of each flight coupon, prints trip information on the front, bonds the coupons together, and then issues the assembled ticket to the passenger.

Data is written magnetically



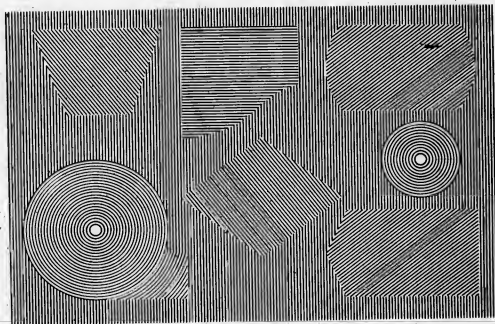
To buy a ticket, customer inserts credit card (left), answers questions in sequence (center), and receives completed ticket (right), after removing credit card.

and then checked for error character by character. An overall redundancy check also is made. If the computer detects an error, the coupon is diverted into a stacker and a replacement coupon

is encoded and checked. Next, information is printed on the front of each coupon.

After printing, each coupon moves to a bonding station for assembly. When the final coupon

has been bonded, the completed ticket is delivered to the passenger. After the ticket has been removed, a separate auditor's coupon is prepared for accounting purposes.



Close one eye. Stare for 60 seconds.

This design from the cover of our latest Annual Report will give you a hint of the kind of company we are. In motion. Concerned with the complex. In the best sense, exotic; but very practical.

We are not interested in computers as clerks.

▲ Nor as substitutes for adding machines, calculators and book-keeping machines.

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Growth: 20-fold in 2 years

Programming Sciences Corporation began business in 1967. Small. Last year our revenues grew tenfold to well over \$1 million. This year they were that large in the first six months. "Growing" is hardly an adequate word.

Among our clients are several manufacturers of large systems. Which means we're far into fourth generation problems. And advanced peripherals. And major MIS software.

Grande called the kind of person we need a "crecher jack." Dad said "whiz." We just say "PSC-type." If you're not just good but highly able on our level, we have a happy home for you. We doubt you'll turn down our offer.

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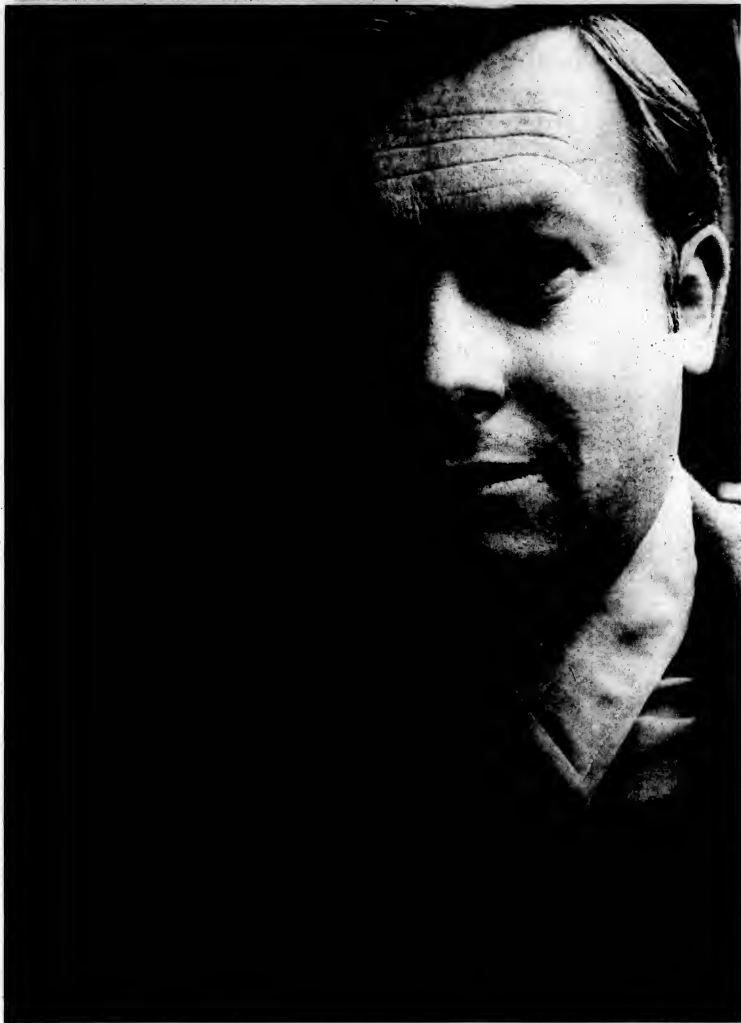
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"The NCR Century has got to have the wildest price/performance ratio in the industry."

—Roger Horsfield, Data Processing Manager, Struthers Nuclear & Process Company, Warren, Pa.

Mr. Horsfield is a computer professional with Struthers Nuclear & Process, a highly diversified company.

He is in charge of an EDP operation that leased a small NCR computer, bought time from a local IBM 360/30 and time shared from a central Univac 1108.

His operation handled a wide variety of programs: production control, administration, payrolls, inventory and a heavy work load of sophisticated engineering data. He used COBOL on the 360/30 and FORTRAN on the Univac.

But Struthers wasn't fully satisfied with this set-up. They wanted a computer system that would get more in-house capabilities yet possibly maintaining the on-line hook up to the Univac.

After an eighteen-month equipment survey, Struthers selected the NCR Century Series. Hands down, against all comers.

How come?

Because NCR has a computer with a "wild" price/performance ratio that will not only handle all the administrative and accounting programs but could take over some of the sophisticated engineering work as well. An unexpected benefit! Mr. Horsfield is planning to do many of these jobs in-house. For less.

An NCR Century 100 has already been delivered that's doing all the COBOL programs. "We were prepared," Mr. Horsfield, says, "to pay \$7-8,000 a month for what this Century is giving us for about \$3,000." Struthers is expecting delivery of a larger NCR Century—a 200—in the near future that will give them in-house FORTRAN capabilities. And since the NCR Century Series offers true upward compatibility, Mr. Horsfield can run all his COBOL programs on the larger computer without any re-programming.

A new breed that gives you more, for less.

The NCR Century Series of computers does not use conventional or

hybrid circuits. It has monolithic integrated circuitry throughout. Only six different patterns make up 80 percent of all its logic circuitry. All the power and reliability—and more—of the hybrids. At a fraction of their size and cost.

Our memory concept is entirely new. Thin film short rods. With speed in the 800 nanosecond range. Yet it's lower in cost than slower core memories because of automated manufacturing techniques.

Each NCR Century gives you at least one dual spindle disc unit with 44 ms average access—the fastest removable unit offered by any main-frame manufacturer. This concept offers the user of even the smallest NCR Century efficient magnetic file processing at lowest cost.

Hardware...

The NCR Century 100 has an internal memory of 16,384 bytes of ultrafast memory (additional 16K is only \$375 more a month). The NCR Century 200 can expand to 512K. 3-way simultaneity is standard on the 100; 5-way on the 200 which can be expanded to 9-way. This means handling many functions simultaneously including processing.

Each dual spindle disc unit stores and makes instantly available over 8.3 million bytes at a 108 KC or 180 KC transfer rate.

Normal input is through punched card or tape readers (you can go on-line, too). Printing ranges from 450 to 3,000 LPM. The top speed is standard for the NCR Century 200; optional for the 100.

Great expandability. Move up to multiprogramming. Or just move in a more powerful processor with the same peripherals. You can increase throughput with higher speed units. They include mag tape drivers. CRAM (Card Random Access Memory). Removable disc units. Paper tape readers and punches. Card readers and punches. OCR. MICR. CRT units.

...And software, too.

No other computer in the NCR Century price range offers so much. Applied programs. Languages. Compilers. Operating systems. Utility routines. (Mr. Horsfield says, "One of the things we were concerned with was the operating system. The NCR Century system is flawless. And NCR Century's overhead speaks for itself—4K versus IBM's 8K.")

He also says nobody delivers a COBOL compiler as good as NCR's for anywhere near the price. FORTRAN and our NEAT/3 are available, too.

The basic NCR Century 100 (a complete system) rents for \$1,910 a month on an extended contract. The NCR Century 200 starts at \$3,350.

We say that the NCR Century is 30-50% percent more productive than competition, at from 30 percent lower cost. And we can prove it.

Write for your fact-filled, eye-opening brochure on the NCR Century Series. EDP Products Marketing, NCR, Dayton, Ohio 45409.



See the NCR Century 200 in action at FJCC, Las Vegas, Nov. 18-20.

CONFERENCE AT A GLANCE

Fall Conference
To Open Nov. 18
For 3-Day Run

(Continued from Page 1)

The program committee has strengthened efforts to have well prepared conference speakers. Previously Robert Perry, Hughes Aircraft Co., a specialist in speech preparation, toured major cities in the country to meet with speakers. This time a two-day session was held in Las Vegas and more than 50% of the speakers came to work on their presentations. The goal is to have no one read his paper.

More than 50% of the speakers sent in slides for review by the program committee. The committee found one-third of them below standard and sent them back with the recommendation that they be redone.

Dr. Alton S. Householder will receive the Harry Goode award and Albert V. Casey, president of the Times-Mirror Co., will be the luncheon speaker. His topic will be "Can America Survive the Exciting Years Ahead?"

The program committee has selected several papers as being of particularly strong interest:

□ An information retrieval system based on computerized coding; John R. Fies, University of California, Santa Cruz; session 15/2.

□ On-line recognition of hand generated symbols; George M. Miller, University of California at Berkeley; session 13/3.

□ An on-line machine language debugger for OS/360; William H. Joseph, Rand Corporation, Santa Monica; session 5/4.

□ A survey of techniques for recognizing parallel processable streams in computer programs; M.J. Gonzalez, C.V. Ramamoorthy, University of Texas, Austin; session 1/1.

□ Proprietary software packages; panel; session 21.

□ A display processor design; R.W. Watson, Shell Development Co., Emeryville, Calif.; session 6/2.

□ CDCS digital simulating system; H. Potash, University of California at Los Angeles; session 27/4.

□ Hypec, a hybrid-computer circuit simulation program; F. Balaban, Bell Telephone Laboratories, Holmdel, N.J.; session 38/4.

□ Computer-aided design of computers; papers and panel; session 23.

□ Publishing versus computing; panel; session 10.

□ Managing money with computer; panel; session 14.

□ Computers for Congress; panel; session 3.

□ Computer-related social problems; effective social alternatives; panel; session 19.

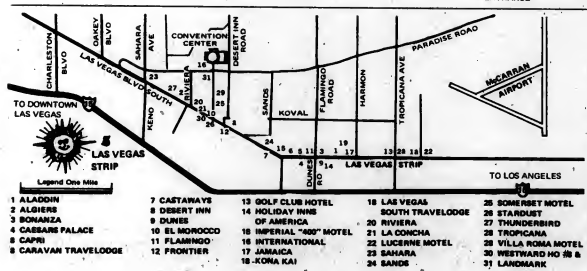
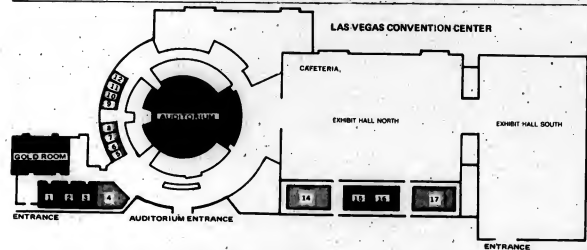
□ The computer security and privacy controversy; papers and panel; session 4.

□ Information management systems for the 70s; panel; session 11.

Special events scheduled are a computer art exhibit, a computer music program, and computer science and art films.

The conference is sponsored by the American Federation of Information Processing Societies. Richard I. Tanaka, California Computer Products Inc., is president; Bruce Gilchrist, director, and H.G. Ahmst, executive secretary.

TIME	TUESDAY, NOV. 18				WEDNESDAY, NOV. 18				THURSDAY, NOV. 20				TIME
9	1	2	3	4	11	12	13	14	21	22	23	24	9
10	OPERATING SYSTEMS	ARMY LOGIC DESIGN FOR THE P-1	COMPUTERS FOR CONCRETE (PANEL)	THE COMPUTER SECURITY & PRIVACY CONTROVERSY	INFORMATION MANAGEMENT SYSTEMS FOR THE P-1 (PANEL)	WHAT HOPKINS TO US FROM THE P-1 (PANEL)	TOPICS IN LIFE TECHNIQUES	MANAGING MONEY WITH COMPUTERS (PANEL)	PROPRIETARY SOFTWARE PRODUCTS (PANEL)	MANAGING TECHNIQUES FOR INTERFACING MAN WITH THE COMPUTER	COMPUTER AIDED DESIGN OF COMPUTER FACILITIES (PANEL)	MANAGEMENT PROBLEMS IN HYBRID COMPUTER FACILITIES (PANEL)	10
11	AUDITORIUM	GOLD ROOM	ROOMS 1, 2, 3	ROOMS 15, 16	AUDITORIUM	GOLD ROOM	ROOMS 1, 2, 3	ROOMS 15, 16	AUDITORIUM	GOLD ROOM	ROOMS 1, 2, 3	ROOMS 15, 16	11
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IBM 2311 Model 1 Disk Drive

\$24,745

If you choose the machine on the right you can get 33% faster average access time, less maintenance, faster start and stop time, and greater operating convenience. That other machine begins to look pretty expensive.

The MAI disk drive is faster because it converts electrical energy into linear motion. Electrical energy can be manipulated faster than hydraulic energy, giving you quicker access to stored information.

Lacking gears, hydraulics, printed circuit motors, fluid connections, and other complicated mechanical systems, the MAI disk drive has fewer parts. Which makes the load-unload concept simpler. It requires no torsion bars or fluid pressure because the loading force is supplied by a simple spring.

A new air circulation system equalizes the disk drive and disk pack operating temperature, which in turn reduces start time as much as 25%.

The 2301 unit is braked electro-dynamically. It takes 10



MAI 2301 Model 1 Disk Drive

\$18,300

seconds to stop at most. The IBM coasts to a stop in 20 to 60 seconds.

Whether you're buying or renting, it doesn't make much sense to pay more for a lesser machine.

- ☐ I would like more information about the MAI 2301 Model 1 Disk Drive.
☐ I would like a salesman to call me for an appointment.

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300 East 44th Street, New York, New York 10017
 Offices in principal cities of the United States and Canada.
 Also offices in Mexico, Europe, South and Central America.

For a demonstration, come to booth #110-111 at the Fall Joint Computer Conference.

Job Assurance Critical Factor

Sponsors Evaluate; Opt to Expand Inner-City Effort

By Milton Bauman

Special to Computerworld

The decision to offer an operator training course brings with it obligations to three groups: the employers, who agree to hire course graduates; the administrators, who must demonstrate that such inner-city projects are not folly; and the students, who are assured jobs in return for their efforts.

To maximize the likelihood of meeting our commitments, the local board of education was approached for a list of prospective students. They were asked to select noncollege-bound students, but to assess carefully the

In 1968, about 20 concerned members of an ACM chapter formed an urban education committee to assess the industry's role in urban problems. Last week, committee member Milton Bauman described their course of action and the decision to offer operator, rather than programmer job training. This week, he describes that class and its results, noting the problems encountered while securing jobs for 20 students.

individual's chances for meeting the demands of such a program. With the help of a local high school principal, 20 students were eventually chosen from 48 suggested by the school faculty.

The curriculum for the course was developed by a three-member subcommittee. First, it attempted to obtain curricula

from other ACM chapters working on similar programs; but, their materials were not sufficiently developed for our needs.

Tailoring the Course

Faced with the prospect of preparing our own materials, we began collecting operator train-

ing manuals from manufacturing organizations and private sources. The material we gleaned from these needed considerable reworking, however, because of the somewhat unusual nature of our program.

After much investigation, a course was designed for IBM 360 operator training that would in-

clude extensive hands-on experience.

In addition to the usual lectures, demonstrations, and practical exercises, the curriculum subcommittee devised a series of "competence level tests."

These were designed to insure that the students were familiar with the equipment from a practical, as well as a theoretical standpoint. The tests were to be administered at each plateau in the training program and would require the performance of a specific task on a piece of equipment before proceeding to the next part of the course.

Establishing the Right Tone

A need for re-education in one area soon became apparent. The instructor and some of the members of the committee were over-solicitous toward the students. They were being treated with kid gloves, no one ever became perturbed with them, and generally, they performed in any manner they wished.

Something was not right, and several members of the committee felt that the permissive atmosphere was not a realistic one for our students. We decided to put our foot down. The students responded well and obviously preferred our more businesslike manner.

Funding an operation such as ours was no small hurdle. Finally \$3,000 was obtained from an independent foundation. With this we were able to hire two instructors. The rest of us, of course, served on a volunteer basis.

Machine time was donated on both punched card equipment and a computer, and several companies made their facilities available to us for field trips.

Placement Problems

Early in the venture, we had to address ourselves to the problem of placing our prospective graduates. We had committed ourselves to locating employment for the students, and realized the grave importance of "coming through."

There were some hangups we hadn't anticipated.

First, the students did not have cars and could not get to sub-urban locations. Therefore, we had to find jobs in the city or very near public transportation.

A second unexpected problem cropped up when we scheduled several interviews for a student one day. When our placement director called the interviewing companies, he learned that the student had never appeared. He then called the student and proceeded to read him the riot act.

Midway through the conversation, the student's mother took over the phone and asked whether it had occurred to the director that her son might not have money for public transportation. The family, it turned out, was on relief, and there just wasn't an extra \$1.20 available. In a few weeks, they thought we

[Continued to Page 20]

100% 1400 to 360 CONVERT-A-CODE

You want to convert your 1400 series programs to 360 but there are problems . . . right?

- Lack of skilled people to do it
- Lack of time to plan and manage it
- Pressure to complete new projects
- Source data and documentation not in good shape
- Cost of people, past time, etc.

There is an answer to these problems . . . a simple answer . . . a guaranteed answer!

The Convert-A-Code System

WHAT IT IS

The CONVERT-A-CODE SYSTEM is not a software package that you buy or get "free" from the manufacturer. Not a package that still leaves your staff 50% of the work to do. Not a package that requires your source to be 100% up-to-date.

The CONVERT-A-CODE SYSTEM is a unique conversion service which converts 1401, 1440, and 1460 programs to System 360 assembly language.

The key elements of CONVERT-A-CODE are a series of powerful translator programs and an extensive staff of conversion specialists. This combination of software and people guarantees users of the service a 100% conversion to System 360.

We will take your 1400 programs (object or source) and return to you standard 360 source assembly language programs, debugged, fully tested, ready to go on the air. DOS, OS, TOS or BPS.

WHO IS USING IT

The service has been successfully used by major insurance companies, banks, brokerage firms, manufacturing companies, and major service bureaus throughout the United States.

Satisfied users include Firemen's Fund Insurance Co., Crown Central Petroleum, FMC Corporation, Connecticut Savings Bank, James Tatott, Inc., Loeb-Rhodes, Tracor Computer Corporation, and the largest service bureau corporation in the United States, among others.

WHY ARE THEY USING IT

Lowest cost per program to convert. Our clients have compared CONVERT-A-CODE costs with the in-house manual approach and the in-house package translator approach, and found CONVERT-A-CODE to be far and away the lowest in cost per program. In addition, the CONVERT-A-CODE charges are total costs including all documentation and computer test time.

CONVERT-A-CODE guarantees 100% conversion for this low cost.

Turnaround time to complete the conversion. Because of the power and effectiveness of our translator and the skill of the team of conversion specialists who complete the work, CONVERT-A-CODE is equipped to handle large volumes of programs in a very short time.

Improved morale of the user's staff. Rather than work on less prestigious 1401 maintenance and conversion work, CONVERT-A-CODE users can devote their staff to new System/360 applications. This often serves to keep staff morale high and allocate their efforts to those new application projects with the greatest payoff.

Excellent documentation. The user automatically receives a complete set of documentation along with his source and SYSTEM. This documentation includes parallel 1401 and 360 listings, op code cross-reference listings, a data map describing constants, and other materials. Compiling the 360 program will also automatically, of course, give you a 360 label cross-reference as well as various symbol table references. If your installation has an automatic flowchart you can also generate a complete flowchart for each 360 program. Thus, a complete set of documentation has been generated automatically. In many cases this serves to protect a significant investment in 1400 series programs which have lacked such documentation.

The CONVERT-A-CODE SYSTEM works from object decks as well as source. It can handle patched programs or 1401, 1440 or 1460 series programs of any language.

The CONVERT-A-CODE SYSTEM works. The CONVERT-A-CODE SYSTEM has achieved proven success in sophisticated installations throughout the country. You have the opportunity to achieve a 100% successful conversion and avoid all of the pain and aggravation typical of such work . . . at less than in-house cost in less time. Before you need make any commitment we will give you a firm written bid in time and dollars. If this approach interests you, why not ask us to submit a bid.

Carl Richard Caroll,
Vice President, 301-752-9772

In New York, New Jersey, Pennsylvania, Delaware, Washington, D.C., and Virginia call Richard W. Thatcher, Jr. Vice President, 215-WA-5424

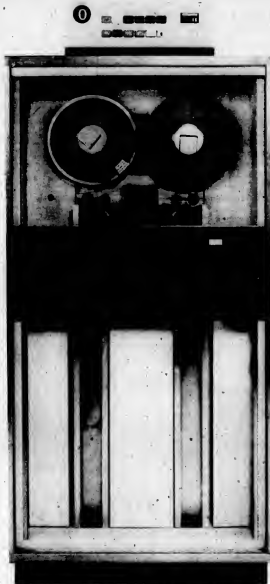
CONVERT-A-CODE CORPORATION

303 E. Fayette St. • Baltimore, Maryland 21202



Atlantic Software Inc.

Lafayette Building • 8th & Chestnut Sts. • Philadelphia, Penna 19106



IBM 2401 Model 3 Tape Drive



MAI 2403 Tape Drive

\$35,655

\$16,400

Cost is one thing. Quality another. We win there, too. The MAI 2403 Tape Drive will do everything that the other machine will do except wear out tape.

With MAI, you don't have to worry about air pressure guides, tension arms, pinch feed mechanisms, mechanical brakes or other things that squeeze, jerk or stretch your tape.

That's all taken care of with a single capstan, vacuum tension and dynamic braking. Because the tape path is so uncluttered the MAI tape drive is extremely easy to load and operate.

And the magnetic read/write head is retractable. So your tapes are never subjected to unnecessary wear or abuse. The only contact with the oxide recording surface of the tape is at the head itself. And then only when the unit is actually reading or writing. During loading and rewinding, the head is retracted.

All MAI tape drives are designed to work with IBM's computer systems at high transfer rates. And they are interchangeable with the IBM tape drives on a plug-to-plug basis. In fact,

it's estimated that MAI now accounts for about 60% of the plug-to-plug interchangeable market.

Whether you rent or buy an MAI tape drive, you save on tape costs and you save on downtime caused by damaged tapes.

And there's that little matter of the price tag.

- ☐ I would like more information about the MAI 2403 Tape Drive.
☐ I would like a salesman to call me for an appointment.

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Company

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City State Zip

MAI

300 East 44th Street, New York, New York 10017
 Offices in principal cities of the United States and Canada.
 Also offices in Mexico, Europe, South and Central America.

For a demonstration, come to booth #110-111 at the Fall Joint Computer Conference.

Low Pay Hampers Work-Study Programs

LANSING, Mich. — Many junior college students are being effectively excluded from work-study or internship programs in data processing because the compensation for their efforts is far below what they must earn to help finance their schooling.

At the same time, increasing numbers of junior colleges are turning to the work-study arrangement in an attempt to combat the "experience required" syndrome encountered by their job-hunting graduates.

"Trainee positions are few, and all other positions require experience," says Stanley Kanada, an instructor at the Lansing Community College. "We feel confident that our intern program will help eliminate this problem. However, the lack of finan-

cial support for the student often excludes from the program those who must have an income."

The choice that emerges is most often one between gaining the experience necessary for finding a job or foregoing the internship for a noncomputer-related job with good pay.

Some schools are successfully coping with the problem. Possible solutions, some of them already in practice, include:

- Placing students in EDP installations as programmers or trainees at the "going rate" for the job in that geographic area. Such an approach has worked successfully for the Bryant & Stratton Junior College in Boston [CW, Oct. 1].

- Obtaining financial support

Education

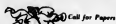
for students with demonstrated financial need through the college scholarship office or a local business or philanthropic group.

- Finding jobs for students in the school's EDP facility. Many schools offer tuition assistance, and some even free tuition, to their employees.

- Developing a program in cooperation with the state, such as one arranged in Michigan between a junior college and the state's civil service department. Although this particular program does not provide wages for the students, it demonstrates the viability of such an alliance.

- Procuring federal assistance, as was done by the State University of New York at Cobleskill, for their internship program that provides teaching and technical experience for candidates completing a bachelors or masters degree [CW, Oct. 8]. Their grant is through the Vocational Education Act.

- The National Science Foundation provides funds for the development and improvement of computer facilities at four-year colleges. It has not yet begun to make similar grants available at the junior college level. However, an NSF spokesman recently stated that such a broadening of its program might be considered because of the increasing number of two-year institutions.



1970 IEEE INTERNATIONAL SYMPOSIUM ON INFORMATION THEORY, June 15-19, Noordwijk, The Netherlands.

The symposium, the information theory group of the IEEE and Commission VI of the International Scientific Radio Union, are soliciting papers on coding theory, detection theory, pattern recognition, and related topics. Papers must be submitted no later than Jan. 2, 1970. V. P. P. Green Jr., IBM Research Center, P.O. Box 1212, Yorktown Heights, N.Y. 10598.

Initial Success Spurs Job-Training Program

(Continued from Page 18)

had been successfully placed all our students. Then one of the hiring companies went out of business; another eliminated one or two systems from their installation; and still another, through a misunderstanding, had thought it was to hire the students for only a brief orientation period.

Again the pursuit began in earnest, and somehow by graduation time, the number of employers equalled the number of employees.

Evaluating the Results

In general, all the employers are pleased with their new workers.

We have attempted to analyze our success. Five areas stand out.

- The large amount of hands-on experience. For four months, the students had access to a 360/30 or 360/40 every Saturday.

- The competence tests administered at important junctures in the course. By the time they were done, the students knew the 360 equipment.

- We knew the needs of the prospective employers. By surveying the market first, we avoided preparing the students for jobs that didn't exist.

- The students were all high school seniors. Nongraduates might have faced equally well in the training program, but probably would have run into stiff industry resistance in placement.

- Most important, jobs were promised. Almost to a man, our students commented that without this incentive, they probably would not have finished the program.

The Second Round

We have now decided to expand the scope of our program to include participation by more schools. We will, however, make some alterations based on our past experience. They include:

- Cutting the class size to 15 pupils. Twenty students seems to be just too many for maximum benefit.

- Increasing the student's stipend from \$2 to \$5 per week to help cover expenses.

- Finding a new source of funds. Although our initial funding came from a local foundation, it would be much more meaningful if the money, as well as the administration, were to come from the data processing community.

In short, we had a few anxious moments. However, had we waited to begin our project until all the obstacles were well in hand, our course might never have become a reality.

New Data Modem

AUTOMATIC EQUALIZATION. The ADS-448 modulator-demodulator automatically equalizes your data source to the telephone line. No manual adjustments.

4800 BITS PER SECOND. This super-modern modem can transmit and receive data in any combination of data rates 1200, 2400, 3600, totaling 4800 bits per second. It is useful in a variety of data systems.

LOW ERROR RATE. Typical error rate is less than one in five million bits. Self-checking loop-back is built in. The modem is insensitive to telephone line phase-jitter.

FRONT PANEL DISPLAY. System diagnostics—including relative line condition—are displayed continuously on color-coded lights on the front panel.

MODULAR DESIGN. One of a family of compatible, solid-state data system modules by American Data Systems; the ADS-448 is versatile, reliable—practical in every respect. Send for full details.





Mohawk 6401 Data Recorder



MAI 100 Data Transcriber Model 2

\$8,000

These key-to-tape machines do the same thing. But experts say the one that costs less does it better.

The MAI Data Transcriber has been designed for maximum reliability and ease of operation. For example, its true character display system simplifies verification by eliminating the need to mentally translate code into characters.

The tape (IBM compatible) loads automatically. Because the tape is contained in a cartridge, hand threading is eliminated. This increases operator efficiency and prolongs the life of the tape.

Tape movement is controlled by vacuum on dual capstan drives. Tape is transported in the same way as in third-generation tape drives.

The keyboard is similar to an 029 Key Punch, which eliminates unnecessary retraining when converting from card preparation. The display console and tape cartridge are set at normal eye

\$6,400

level and all switches are within easy access of the operator.

Whether you're renting or buying, for the highest quality sometimes you should pay less.

- ☐ I would like more information about the MAI 100 Data Transcriber Model 2
☐ I would like a salesman to call me for an appointment.

Name

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300 East 44th Street, New York, New York 10017
 Offices in principal cities of the United States and Canada.
 Also offices in Mexico, Europe, South and Central America.

For a demonstration, come to booth #110-111 at the Fall Joint Computer Conference.

calendar

Nov. 17-18, Las Vegas — The fall meeting of the Council to Advance Programming, for the Honeywell computer control division's user group. Contact: Ronald Meyers, Honeywell Computer Control Division, Old Connecticut Path, Framingham, Mass. 01701.

Nov. 17-21, Washington, D.C. — Simscript II, a course given by Philip J. Kiviat, designer of the system. Contact: Arnold Ockene, Vice-President, Simulation Associates, Inc., 600 N. Broadway, White Plains, N.Y. 10603.

Nov. 18, Detroit — A series of technical briefings on their new proprietary software package RMS (resource management system), offered by Brandon Applied Systems, Inc. Also in Toronto, Nov. 20, and Montreal, Nov. 25. Contact: Matthew R. Smith, Brandon Applied Systems, Inc., 1700 Broadway, New York, N.Y. 10019.

DPMA Unbundling Briefing, Tailored For Users, Offered in Six Major Cities

PARK RIDGE, Ill. — Unbundling, the separate pricing policy to be effected by several major computer manufacturers Jan. 1, 1970, will be the topic for a series of management briefings to be held in six major cities this fall by the Data Processing Management Association.

Since unbundling will result in separate price schedules being implemented for hardware, software, systems engineering, and data processing education on at

least a portion of the manufacturers' offerings to users, its impact on the management, operation, personnel, and training requirements of many computer installations will be both immediate and far-reaching.

How will individual installations be affected? What will be the effect on budgets? What does senior management want to know? Which operating areas will be most severely affected? Which areas offer the greatest

opportunity for optimizing increased costs?

These are among the critical questions being asked and which will be discussed at each of the briefings. The briefings are tailored for data processing users and will deal in specifics insofar as practical.

Each session will offer full group discussion with invited speakers in the morning and provide for split-group workshops in the afternoon to enable participants to explore individual situations. Separate workshop sessions will focus on the areas of education, engineering, and programming software.

General discussion will cover such topics as in-house training programs, additional staff re-

Societies

quirements for training systems and programming, type of support needed from equipment manufacturers, and services and software obtainable on the open market.

The dates and locations for the DPMA "Unbundling Briefings" are as follows: Nov. 13, Los Angeles; Nov. 14, Portland, Ore.; Nov. 20, Chicago; Nov. 21, Dallas; Dec. 4, Philadelphia; and Dec. 5, Cleveland.

Additional information and registration forms are available from DPMA Headquarters, 505 Busse Highway, Park Ridge, Ill. 60068.

If you've been wanting someone to build a low-cost digital tape drive with Hewlett-Packard quality, HP just did.

We've taken the OEM experience we've gained from putting almost 4000 digital tape systems in the field. Added what you've told us you'd like to see in a low-cost tape drive for small computers and off-line applications. And produced the HP 7970.

It has all the features you're looking for in a digital transport: IBM and ASC/II compatibility, 25 ips speed without program restrictions, DTL/TTI compatible interface. Seven or nine, track capability with simple field conversion. Standard 10 1/2 inch reels. Plus handsome appearance, fingertip push-

button controls, backlit indicators for quick operational status checks, dual gap head for read-after-write error checking capability.

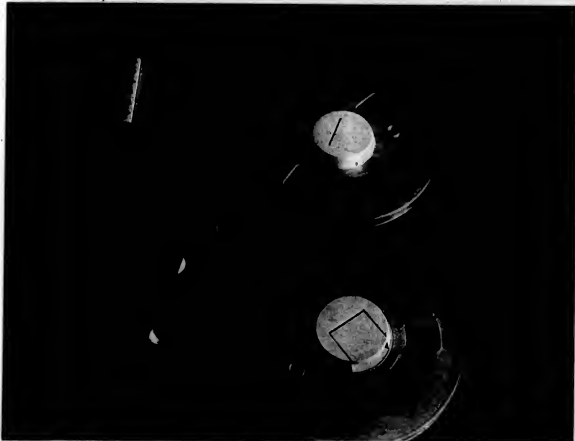
It also has HP's exclusive trouble-free design and rugged construction, with cast aluminum frame, automatically milled to precise reference planes. The tape transport components are mounted to this frame on precisely indexed bosses to assure that tape path tolerances are routine. The HP 7970 also has electronic deskewing, direct drive motors, single capstan, and dynamic braking that eliminates mechanical adjustments. Plus

the back-up capability of 141 Hewlett-Packard sales and service offices around the world.

So if you want a low cost digital tape drive with HP quality, call your Hewlett-Packard field engineer for more information on our new 7970. Or write Hewlett-Packard, Palo Alto, California 94304; Europe: 1217 Meyrin-Geneva, Switzerland.

HEWLETT PACKARD
MAGNETIC RECORDERS

See us at Booth 2000, FJCC



Art, Music, Tours Highlight FJCC Ladies' Plans

LAS VEGAS, Nev. — Among the special activities planned for the record number of women expected to attend the 1969 FJCC here are a tour of Hoover Dam and Lake Mead and a visit to Nellis Air Force Base, where a film of the renowned "Thunderbirds," the official USAF precision air demonstration team, will be shown.

Ladies activities actually begin Tuesday morning with the "What's It All About, Alice?" presentation, in which Dave Goldsmith of IBM will fill in the ladies on their computerized world.

Luncheon will be served, followed by a tour of the FJCC exhibit area at the convention center.

Other conference attractions include the computer music exhibit, the FJCC art exhibit, the computer sciences and arts poster, and a demonstration of the Clark County Sheriff's computer-oriented information retrieval system.

Light-weight wools are suggested for daytime wear, and a cocktail dress and light wrap for evenings.

SUBSCRIBE TO
COMPUTERWORLD

November 12, 1969

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Problems of Conversion-Part III

Language Conversion Methods and Results Examined

By Peter L. Briggs
CW Software Editor

The most talked-about, and probably the most fearsome, area of computer conversion is reprogramming.

This involves moving operating programs from one computer to another, and probably a quite different computer. For those companies working in higher-level languages such as Cobol, this problem has not been as great as it has for the 80% majority using assembly-level languages since computers were first brought into their companies.

Language translators, simulators, emulators, compatibility hardware, conversion services, macro-language generators, and various combinations of specialized packages all offer some means of getting from System A to System B with less work than complete reprogramming.

Emulators, Etc.

For the S/360, which has caused most current major system conversions, IBM offers several levels of compatibility, simulation, and emulation.

Compatibility is defined as a hardware capability that allows the S/360 to appear as a 1401, 1440, 7090, etc.

Emulation is achieved by a software package that controls the operation of a program, translating the instructions into S/360 native language before execution.

Simulation is a combination of both techniques, with some hardware and some software support.

Many of these devices operate quite well, but they all suffer from the same problem: the programs remain in the original form, unable to take advantage of the S/360 I/O capabilities, file formats, and processing abilities. Thus much machine time is wasted and systems remain in their archaic form indefinitely.

This situation is usually allowed to continue until the new systems for the native 360-model and compatibility-based systems begin fighting each other for machine time. Only under the DOS compatibility operating system (COS) is it possible for a user to operate both emulation and native-mode simultaneously.

Language Translation

When the user has exhausted the resources of his current configuration due to the strain of maintaining both types of programs in the same operating environment, he is presented with

the problems of converting or upgrading from one computer system to another are well known to those who have been through them. To these people, we can only offer our sympathy. But there are many users and middle and upper-level executives who have never lived through a conversion. This four-part series of articles which describes the problems of conversion and offers some solutions, is aimed at such people.

two alternatives - he can either buy from outside vendors or get free from IBM a translator package that will allow him, with manual assistance, to convert his assembly-language programs into either S/360 Assembler Language or Cobol.

IBM Packages

IBM offers several conversion packages. Accol converts Autocoder to Cobol with about 80% effectiveness. Escap offers a similar service with slightly better results. There also are converters to get from one higher-level language to another, for instance from Cobol to PL/I or from Fortran to PL/I. All of these packages, including Computer Sciences' Exodux, suffer

from the same problems - they require a great deal of manpower, they do not convert more difficult parts of the program, and they produce inadequate documentation and testing aids.

Services Possible

At least two companies are offering various types of S/360 conversion service. CPU Management Advisory Corp. of New York and Convert-A-Code of Baltimore, Md., offer three levels of service: produce an Assembly Language program from the original Autocoder source or object deck, produce a clean, assembled AL program from the same sources, and produce a guaranteed operating AL program, complete with testing on user-supplied test data.

Macro-Language Generator

Advanced Computer Technology of New York offers a package known as Help. It can be set up to define any type of input language and produce any desired output language. It would be possible to convert from, say, Autocoder to PL/I, provide a user could include the effort into writing the logic for the desired translation steps.

Mixed Packages

Using a combination of in-house and available packages, it is possible, for instance, to examine an Autocoder program using a flowcharting package such as Autolflow by Applied Data Research, Princeton, N.J., and to produce a decision table that describes the program's function. With this decision table, a Detec, by Information System Leasing of Philadelphia, a user could translate into S/360 Cobol. Most of these techniques require a fairly experienced programmer and systems analyst to prepare and carry out the conversions. Other combinations of packages could produce similar results with other languages or types of systems.

Costs

To examine the detailed costs of each type of conversion a user can review the basic figures developed by John Crevier, research director of Diversified Data Services and Sciences.

Speaking at the DPMA meeting in Montreal last spring, he contended that the average computer installation would have conservatively 100 programs, that programmers cost about \$250 per week including material, but that four hours of machine time per program that cost about \$50 per hour.

Reprogramming

For complete reprogramming, he felt that the average programmer would require about three or four weeks per program. Reprogramming would also require, perhaps, four hours of machine time per program. The total cost for each program would then be

about \$1,200. For the normal installation, this would come to about \$120,000 plus some 8-1/3 man-years of programming effort and 400 hours of computer time drained from a company's resources.

Translators

Those experienced in using translators have said that IBM translators require about half the man-time that would otherwise be needed for reprogramming. These persons contend that the machine time requirements are higher, by about 25%. Using the previously developed figures, the total cost per translated program would run about \$750, making the installation total about \$75,000, plus some four man-years of programming effort and 500 hours of machine time drained from available resources.

Translation Services

The two translation services mentioned above offer a complete conversion service. Based on supplied prices, an average program can be completely converted for about \$500, making the total for an installation about \$50,000. This, however, does not reflect the savings in resources, which can vary from \$70,000 for complete, in-house reprogramming to about \$25,000 for use of the translator approach.

Macro-Language Generator

To use the macro-language approach, one would have to commit about one year of a top-grade programmer's time, worth about \$17,000, including overhead. The rest of the costs would be similar to those encountered in use of a manufacturer-supplied translator, but a user would gain much more flexibility and accuracy. The total costs would probably run about \$92,000.

Mixed System

No reasonable way to establish the use of mixed-system packages costs is readily available. The costs would depend on the languages involved, the availability of certain packages, and the skill level of the in-house staff. The costs of a mixed system would probably be closer to those of the translator approach than to the reprogramming approach.

The concluding article in this series will present some of the available techniques for avoiding a recurrence of this type of major conversion and the possible implications of these techniques on the computer industry and computer users. Higher-level languages seem to offer a somewhat better alternative, but which languages?

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Disk Operating System for H-P 2116B
Requires Only 8,192-Words of Core

PALO ALTO, Calif. - A disk operating system, which the developer claims can do batch processing and other "large system" jobs while requiring only 8,192 words of core, is available from Hewlett-Packard Co.

The DOS can be operated either from a keyboard or from a card reader. As a keyboard monitor, the system greatly reduces paper-tape handling, the bane of typical small-computer operations, the company says. With the new DOS, an operator can read a program into the system once and then sit back while the system assembles or compiles, loads, and executes it.

The assembler, compiler, loader, source program, and intermediate versions of the program are moved automatically between disk and core, as needed, the firm says. This means that an operator doesn't have to handle two or three tapes at each step in the process. Consequently, the system speeds and simplifies the creation, checkout, and operation of programs, according to the company.

As a batch monitor, DOS is controlled by decks of punched cards and requires no operator intervention. However, the operator can use the keyboard to resume control at any time. For batch processing the system operates continuously to do a series of jobs, each of which can have



HP 2116B computer system

Independent programs and different I/O configurations. At the end of each job the date, start time, elapsed time, and execution time of the job are printed out.

The DOS also provides disk file management. A user can define files by name, type, and size. He can then write data into a file or read data from it, and he can release or "purge" unneeded files from the disk, according to the company.

Software

If a user chooses to buy additional core memory, the executive program can be made core resident instead of disk resident, thereby increasing efficiency by eliminating the disk access time, the company says.

Programs for the DOS can be written either in Fortran or in assembly language.

Hardware

The minimum hardware configuration for the DOS, costing about \$60,000, consists of an HP 2116B computer with 8K memory, a head-per-track disk file, and an ASR-35 teletypewriter. Recommended options include a card reader, a line printer, a paper tape punch and photo reader, and an additional 8K of core memory.

The Hewlett-Packard disk operating system will be shown for the first time at the 1969 Fall Joint Computer Conference in Las Vegas, the company says. Hewlett-Packard is located at 1501 Page Mill Road.

Communications Managers Group Discusses Innovations

By Ronald A. Frank
Communications Editor

NEW YORK—A little-known but highly knowledgeable group of data specialists meets here regularly to discuss current innovations in the field of communications.

Known as the Communication Managers Association, the group is limited in membership to managers of large communications-oriented firms with high-volume intercity communications traffic.

Formed in 1948, CMA currently has more than 80 members representing companies mostly from the New York area, although firms from Boston to North Carolina are included, according to the organization's president, James C. Jarvie.

Although each of the CMA member firms is vitally interested and affected by proposed changes in communications tariffs and services, Jarvie told CW that CMA as a group is forbidden under its by-laws from taking a public position on any such matter. When asked why CMA would not take a position on this type of problem, Jarvie said that a tariff issue would be beneficial for one member and detrimental for another.

"While we are vitally concerned from an individual viewpoint, we just don't know the effect that a proposed tariff may have on one of our members," Jarvie said. "When you take a positive or negative stand and then a neutral stand or other instances, you've already weakened your position," he added.

Communications

Jarvie said that the primary purpose of CMA is to provide the means for an interchange of technical information among members. To implement this goal, the group has monthly meetings that feature presentations, by carriers, vendors, and others knowledgeable in communications.

When asked why CMA membership is limited to large communications users, Jarvie explained that the small data user would have little to contribute or add to the membership. "Our members operate complex data

networks, and the small user with one or two terminals would have little in common with the type of problems we encounter," Jarvie said.

Jarvie, in addition to his office in CMA, holds the position of communications manager with the Equitable Life Assurance Co. When asked whether his company would get involved with tariff issues, Jarvie explained that since Equitable is a regulated company, it does not take a stand on public issues as a matter of policy, since this could tend to alienate a body of insurance policy holders.

When asked how he felt about the proposed data rate increases of the New York Telephone Co., the CMA president said that the phone company should get the

increase. In explanation, Jarvie said that New York Bell "has not had a rate increase in 11 years."

"If we want good service, we will have to pay for it. The phone company is faced with increased costs of labor and materials and it will have to obtain additional revenue in order to maintain its current level of service."

Although admitting that some Bell services are not what they should be, Jarvie said that increased revenues requested by Bell are justified. Asked whether he thought that increased control over Bell would help to improve service, he said that although control in the area of tariffs is probably necessary, "the more you restrict a company, the more problems you have."

When asked whether CMA as a group enjoyed good relations with Bell, Jarvie said that the phone company often has sent representatives to make presentations at the group's meetings. "Since we are among Bell's biggest customers, we should get the best service," he said.

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The system permits simulation of basic hand recording methods, follows generally accepted accounting principles and procedures, provides an effective method of error control and audit trail, and supplies formalistic presentation of data without special programmed forms.

Modular Design

The total system is modular, and independent groups of modules may be purchased.

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 - Balance forward for History, Phase II
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 - Flexible Chart of Accounts
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 - 30 characters of Alpha for account titles
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 - Year-to-date adjustment capability
 - Current net change adjustments
- Comparative Financial Statements** (Profit and Loss Statement, Balance sheet, schedule)
 - Yes or No (no account codes on statements)
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 - Variable financial headings
 - 30 character account designation
 - Unlimited total usage
 - Unlimited scheduling
 - Unlimited consolidation of accounts
 - Ratio and percentage analysis
 - Current and year-to-date information

chased to fit the users' program needs. CAS III is programmed in BASIC, requires a minimum configuration of 32K bytes of core in TOS or DOS environment.

Report Flexibility

Accounting reports headings, column designations, indentation, total levels, combining, scheduling, etc. are determined by the user, through input, to allow tailored report presentation. Ledgers require no fixed chart of accounts and allow 30 characters of alphabetic account description. The ledger offers a flexible code number structure. The user may employ a one to six digit code number along with sub-account designation. Subsidiary ledgers are reached through a special four digit code number.

Audit Features

All data enters the system through a journal or register and is automatically checked for arithmetic or posting errors. Errors are flagged and presented in an error analysis.

PHASE II ACCOUNT ANALYSIS MODULE

Accounting information to selected general ledger accounts are accumulated and processed by report.

PHASE III STATEMENT CONSOLIDATION MODULE

Allows consolidation of several individual business divisions or departments.

PHASE IV BUDGETARY AND COMPARATIVE MODULE

A Budgetary financial reports
B Comparative general financial statements

CAS III is the most important, singular advance in financial control software to become available to 360 users. Whether you need this program for your company or for a Service Bureau application, more than 100 complete details will be sent to you immediately.

report. Each journal has a debit and credit trial balance, is posted to the general ledger, balance forward or in detail by entry, including day, reference number, journal source, alphabetic description, historic analysis upon request. A unique year-end file allows simultaneous processing of current and past year.

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CAS III is adaptable to the needs of any size and type business: manufacturing, wholesaling, retailing, chain, franchising, banks, insurance, institutions, and services. System includes accounting journals, General Ledger, Financial Statements, Government Reports, and financial reports needed for good management control. Program Manual for set-up, operations and administration, including all needed forms, are furnished.

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 - Year-to-date statement history department, etc.

PHASE VIII TIME ANALYSIS MODULE

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FCC Amendment Would Affect Common Carriers

WASHINGTON, D.C.—The Federal Communications Commission has proposed an amendment to its rules that would require a common carrier, such as the telephone company, to give advance notice to customers whenever rate increases are planned.

Under the proposed changes, a customer such as a data communications user would have to be informed of impending rate increases 60 days in advance, instead of the current 30-day requirement.

No Requirement Now
Existing FCC tariff rules do not require a carrier to give customers any notice of tariff (rate) changes before the legal filing of official tariff documents with the commission, the posting of copies "at certain locations within the operating territory of the filing carrier."

In stating that these existing requirements may "no longer be adequate," the FCC said that customers should be informed when increases in charges or changes affecting discontinuance, reduction, or impairment, of service are involved.

In addition to providing customers with detailed information, the FCC proposed that common carriers "will have to provide the commission with all relevant data necessary to evaluate the proposed changes. The commission stated that additional details would be required since "many carriers are providing only the minimum amount of information necessary," when filing for tariff changes.

Interested parties may file comments on the proposed rule with the FCC at 1919 M Street, Washington, D.C., by November 25.

Bruce Forsberg of
NCI Atlanta reports on

"A powerful new language requiring simple forms and a skinny manual"

"No wonder WORK TEN is an eye-popping new language. The manual is less than 50 pages. And once through the manual is about all you will ever need. The forms you use list the things you can say, and what the default is if you omit something. They even show the types of actions to take.

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A price/performance advantage such as this could be incentive enough. But there's more. Much more. The IODISC series one thousand data storage system offers all the benefits of removable and interchangeable media in combination with on-line storage. The

system provides for unlimited off-line storage utilizing removable cartridges. Incorporated in the IODISC system is a storage controller for data interfacing; an adaptor for memory interface with other systems; and an integral power system.

The IODISC 1012 drive, with a removable disc in combination with a non-removable disc, stores up to 22 million bits of information. Both discs are served by the same moving actuator mechanism which carries one head for each of the

four disc surfaces. This unique design approach provides, on a single drive, the capability to interchange data between the IODISC pack and the fixed disc. The result — one drive with the ability to handle many applications normally accomplished by two drives. For additional system storage capacity, IOMEC offers the IODISC 1011 drive which uses a single 11 million bit removable disc.

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Central Processors at the FJCC

IBM to Show 2 Data Communication Units, System/3

WHITE PLAINS, N.Y. — Three of the newest data processing systems introduced by IBM will be demonstrated by the company for the first time at the FJCC.

They are:

□ A System/3 disk configuration — a low-cost, stored-program computer system designed especially for small business.

□ A 2770 data communications system — a modular terminal that can handle in various combinations punched cards, paper tape, manual keyboard input, magnetic tape cartridges,

Micro input, visual display, and printing.

□ A 2790 data communications system — a high-speed, two-way plant communication system that can collect data from more than 1,000 remote work stations and feed computer-processed information back to the manufacturing floor.

A typical billing application for small business will be demonstrated on the disk version of System/3. The disk system consists of four interconnected functional components: a central processing unit, a multi-

function card unit, a printer, and a disk storage unit.

The 2770 will feature an invoice-writing application on a configuration that includes the 2772 multipurpose control unit, the 2213 printer, the 2265 display station, and the 2502 card reader. The system will be connected via common carrier lines to a 360/40 in Raleigh, N.C.

The 2770 uses the binary synchronous method of data transmission, enabling it to communicate with another 2770 or with a 360/25 and larger.

The 2790 demonstration will

show how multiple data entry units, which can be conveniently located at remote work stations, are linked to a system controller that assembles, checks, and routes records to and from a computer.

Comprising three main elements — a data-entry unit, an area station, and a system controller — the 2790 can operate with the S/360/25 through 85

and the 1800 data acquisition and control system.

In addition to badge and card data entry units, a printer will be attached to the area station to demonstrate how dispatching information can be obtained on the manufacturing floor.

All of these products were announced by IBM last July and will be delivered to customers beginning next year.

Mini Can Interface Up to 96 Lines

SANTA ANA, Calif. — A new mini-computer, designed spe-

cifically for data communications applications, will be introduced by Micro-Systems, Inc. at the FJCC.

The new Micro 812 is the third in their series of micro-programmed, digital computers. The Micro 800, a microprogrammable computer, and the Micro 810, a microprogrammed adaptation of the 800, were introduced last spring.

Priced from \$10,000, the 812 system can interface with up to 96 low-speed lines, up to 32 medium-speed lines, and can accommodate up to six different baud rate combinations at one time, according to Fred Cox, president of Micro-Systems, Inc.

The data transfers are buffered on a block basis, where the data block can be up to 255 characters, and relocatable. This simplifies application software, the company stated.

The Micro 812 is also capable of handling mixed combinations of communications devices at one time, including low-speed asynchronous modems, medium-speed synchronous modems, serial teletypewriters and binary devices, the company says.

I/O can be either serial or parallel, according to the firm.



Micro 812 can interface with 96 low speed lines.

Spiras to Offer Process Control Unit

WALTHAM, Mass. — A 1.8-μsec memory and core, expandable from 4K to 64K, highlight the entry from Spiras Systems, Inc., a subsidiary of USM Corp.

Set up as a stored-program processor, the unit is intended for process-control applications and central data acquisition systems.

This will be the company's first showing of the system, and it will include full software and complete maintenance support.

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Central Processors at the FICC

System 86 Can Control 64 Operations

FORT LAUDERDALE. Fla. The first in the new System 86 family of Systems Engineering Laboratories', recently announced computers will be the center of SEL's display at the FICC.

Complete with a .600-nsec

memory cycle and an output processing speed of 1.66 million word/sec, the company says the System 86 is designed for simultaneous control of real-time applications and up to 64 operating tasks.

The principle support language

for remote terminals is Basic. Batch software includes Fortran IV; Sysgen, a macro assembler; and utility programs.

On-Line Price/Performance

To live up the presentation, the company is producing on-line price/performance analyses for the System 86, the Sigma 5, and the IBM 360/44. The data supplied shows some discrepancies for the 360/44, particularly in execution times, but strongly points out the large improvement in price/performance possible with this new system.



Engineer works with new System 86.

Hewlett-Packard to Exhibit 2114B

PALO ALTO, Calif.—Show visitors at the FICC will find Hewlett-Packard's exhibit divided into five general areas, reflecting the company's current efforts in time sharing, education, computation, instrumentation, and OEM systems.

According to William Davidow, marketing manager of the company's data products group, "An extraordinarily broad problem-solving capability has evolved out of Hewlett-Packard's long-standing involvement with the sciences and engineering, and has begun to find its way into other fields as well. At FICC we intend to demonstrate this full HP capability."

Among the new products in the HP exhibit will be a new disk operating system, called by Davidow "a sophisticated system that operates in as little as 8K of core memory."

DOS has special features for managing disk files, and it can assemble or compile, load, and execute programs without operator intervention. Batch processing will be one of its major applications.

The company will also introduce a new version of its 2114 mini-computer, the Model 2114B, and will demonstrate a number of other systems, including its 16-terminal Basic-language time-shared system, a multiprogrammable real-time executive system, a logic module tester, and a special computer system for classroom use.

The real-time executive system will be featured in a typical laboratory instrumentation environment, while simultaneously operating a remote data entry system, several displays, and a remote computer.

Peripherals and OEM products will include a new X-Y graphic recorder and a new X-Y CRT display, as well as the company's optical card reader and digital data coupler. The coupler takes data from laboratory instruments and puts it on tape for entry into a time-sharing terminal or other computer system.

Calculator buffs will be able to

see HP's full System 9100, which now includes two programmable desk-top calculator models, a printer, an X-Y plotter, and an X-Y display.



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Schedule of Technical Briefings

MINNEAPOLIS December 4	MILWAUKEE December 2	DETROIT November 18	PITTSBURGH December 11	TORONTO November 20	MONTREAL November 25
	CINCINNATI December 9				

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Central Processors Century 200 Has 'Card Random Access Memory'

DAYTON, Ohio—NCR's exhibit at the FJCC will feature the Century 200 computer with Cram (card random access memory). Demonstrations will center around the benefits available with Cram, including expanded mass storage and increased on-line capabilities.

Highlight of the Century configuration will be three 640 high-speed printers producing at the combined speed of 7,200 line/min. Individually, each printer can print up to 1,500 alphanumeric lines per minute and 3,000 numeric lines per minute, the company says.



NCR Century 200

Wilkinson Computer Offers System

BEDFORD, Mass.—A new high-speed, general purpose digital computer will be introduced by Wilkinson Computer Sciences at the FJCC, the company has announced.

The WCS-881 series is designed with the complete system in mind, the company says. The memory structure permits expansion to any system requirements from 4K to 65K bytes.

the company states.

The open construction feature of the WCS-881 allows for the addition of up to 15 printed circuit cards for system expansion. Up to 512 different devices, including magnetic tape stations, disk files, and monitoring consoles can be interfaced, the company says.

The price, including 4K core; ASR 33TTY and control unit; hardware multiply and divide; DMA; and four priority interrupts is \$8,810, the firm announced.

The WCS-881 computer and a cross-section of peripheral devices will be on display at booth 122 at the FJCC.



GA To Show Control System

ORANGE, Calif.—An operational System 18/30 automatic control system will be exhibited by General Automation, Inc. at the FJCC, the company announced.

The GA System 18/30 incorporates the GA SPC-12 micro-computer, the GA 1804 processor, GA mini-controllers (system interface units), and a selection of interface units.

The GA System 18/30, designed for centralized or distributed computer concepts, processes over 400,000 instructions per second and has a 960 nsec memory available in 4K increments up to 32K, the company said.

The new equipment will represent the company's line of industrial computer products.

The basic system price, including paper tape and keyboard, is



approximately \$20,000, the company announced.

A narrated slide display at the exhibition will illustrate computer technology services provided by the company's automation sciences division on a variety of industrial automation projects. Included in such projects are: systems engineering, application programming, installation and maintenance, and field service assistance, the company stated.

The equipment will be on display in booths 8101-8104 at the FJCC.

(Continued on Page 33)

Control Processors

(Continued from Page 32)

Datamate 16 Computer To Cost About \$14,900

BIG SPRING, Texas—Datamate Computer Systems, Inc. will exhibit the Datamate 16 at the FJCC, the company an-



nounced.

Designed for applications requiring powerful real-time I/O capability, the Datamate 16 offers fully parallel 16-bit operation and a one microsecond full-memory cycle time, the company says.

Company President George A. McAlister Jr. announced that the price of the Datamate 16 is approximately \$14,900.

The company will be located in booths 7403-7404.

Computer Utility Products

MINNEAPOLIS—Products for the computer utility that be stressed in Control Data's demonstration at the FJCC, the company announced.

An operational CDC 6413 computer system will highlight the exhibit, the firm said.

The system will demonstrate a series of computer capabilities that include local and remote batch processing, interactive object programs, and information retrieval applications, the company said.

In addition, it was stated, five new OEM peripheral products will be exhibited. These include the 9486 disk storage unit, the 9790 display drum memory station, a terminal paragraph printer, the 9220 Mark II card reader, and the Model 9330 ticket printer.

The company is located at booths 7500, 7600, and 20003-20004 at the FJCC.

Datacraft DC 6024

FORT LAUDERDALE, Fla.—The DC 6024 digital computer will be exhibited at the FJCC, the Datacraft Corp. announced.

To be located at booth number 5001, the DC 6024 features a full cycle time of 600 nsec and a fixed word length of 24 bits. These features provide rapid memory access, ease of programming, and a real-time capability approaching that of a multiprocessor or large-scale system, the

company says.

The basic system, which sells for \$53,900, includes five 24-bit general-purpose registers, three of which may be used for indexing, an 8K word memory (with parity) which is expandable to 64K words in increments of 8K words, hardware multiply/divide/square root, four levels of priority interrupt and a standard software package. The basic I/O structure includes a console ASR-33 typewriter, the company says.

'Dual-Environment' System

IRVINE, Calif.—The Varian 520/DC system will be exhibited by Varian Data Machines at the FJCC, the company announced. Two major elements make up the Varian system: a 520/1 computer and a 520/1-60 communi-



cation controller.

Both elements contribute to the speed and versatility of the data-concentrator system. The 520/1 computer, for example, is a byte-oriented machine.

The 520/1 has also been designed with a "dual-environment" that allows it to respond to frequent interrupts with minimum loss of processor time. One set of registers is used to process input/output transfers while a second set of registers handles the data processing program, the company says.

The function of the second element, the 520/1-60 communication controller, is to assemble the serial bits being received on the communication line into parallel bytes, that can be handled efficiently by the computer, the company stated.

The company will be exhibiting in booths 101-107 at the FJCC.

Analog/Hybrid

ANN ARBOR, Mich.—The



new AD/Five 10-volt-reference analog/hybrid computer system will be exhibited by Applied Dynamics at the FJCC, the company announced.

The AD/Five features many state-of-the-art advancements in

its basic configuration, component design, control structure, saving, man-machine communication and interfacing, the company stated.

In addition, it was stated, when not serving as a multiple-console hybrid, the AD/Five can function as a stand-alone analog computer.

The company will be located at booth 6900.

1601 Similar to Nova

CUPERTINO, Calif.—Working models of a new 16-bit word general-purpose digital mini-computer will be shown at the FJCC, the Roim Corp. has announced.

The new machine, designated Model 1601, is architecturally identical to the Nova, manufactured by Data General Corp., the company stated. All interfacing functions, software and electrical I/O interface are identical to the Nova.

However, the machine is smaller, weighs less, and consumes less power than the Nova, the company stated.

The company will be exhibiting in booths 7413-7414 at the FJCC.

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REQUEST FOR QUOTATION

EASTERN IOWA COMMUNITY COLLEGE
1823 State Street
Bettendorf, Iowa 52722

Quotations will be received by the Board of Directors of Eastern Iowa Community College up to 7 o'clock P.M., C.S.T., November 24, 1969 at the office of the Secretary, 1823 State Street, Bettendorf, Iowa, at which time quotations will be opened and read aloud, in accordance with the conditions and specifications for:

Sale of General Electric 225 Computer System as listed below:

QUANTITY	MODEL	DESCRIPTION
1	CB225C	Central Processor with 24,000 character core memory includes console and output typewriter
1	J225A	BCD Package — includes decimal add, subtract, 3 way compare & 96 index registers
1	D225B	Card Reader, 400 cpm
1	E225K	Card Punch, 100 cpm with DPBC detection
1	P225A	High Speed Printer and Controller, 900 lpm
1	MT680	Magnetic Tape Controller
2	MT680	Magnetic Tape Unit (15K in BCD & 21.6K in decimal)
1	M225B	Disc Storage Controller
1	DSF204	Disc Storage Unit (4,700,000 characters)

All conditions, specifications and bidders blanks are inseparable parts of the proposal or bids, and anything applicable contained therein must be considered a part of the bidding blanks.

Bidders blanks and any additional information relative to the bid may be obtained at the business office, 1823 State Street, Bettendorf, Iowa 52722, phone 319-356-4763.

For technical information on the equipment, bidders may contact L. Stone, DP Program, 601 West Second Street, Davenport, Iowa, phone 319-326-4401.

The Board reserves the right to accept or reject any or all bids and to waive any irregularities in any bid.

By order of the Board of Directors,
EASTERN IOWA COMMUNITY COLLEGE
Ellen G. Meier, Secretary

Package Systems on Display at Las Vegas

Customers Dictate Design of Computer

LOS ANGELES—Call-A-Computer, Inc. will introduce its new computer, the Innovator 7000, at FJCC. This first public demonstration of the Innovator 7000 culminates nearly two years of development effort, the company says.

Company officials note the machine is the result of a new concept in computer construction: the customer dictated its design. Specialists created a unique software package specifically for time-sharing applications and had Standard Computer, a California-based computer manufacturer build it. Up to now, the customer has had to accept a package of both hardware and software designed and dictated by the manufacturer, the company says.

The advances of the Innovator 7000 will allow customers to utilize a broader range of terminal devices, from the industry-standard teletypewriter to the television-like CRT console, to high-speed printers and plotters, according to the company. At its FJCC display, Call-A-Computer will show the Innovator driving four different terminals.

An addition to commercial time-sharing is the Innovator 7000's associative file system which allows customers to devise powerful information retrieval systems. The company claims that they have the ability to mix languages within single programs.

From a technical standpoint, the key to the machine lies in

the Innovator 7000's microprogramming capability. This allows the computer to be "wired with words" so that the entire system can be modified without physically rewiring the machine.

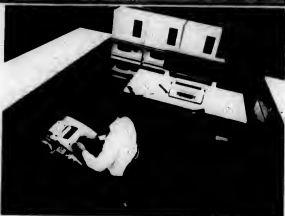
The Innovator 7000 is actually a triple computer, with one computer handling communications and overhead tasks, a second supervisory unit scheduling the central processor tasks, and a third actually performing arithmetic computations.

Each of the last two can access the Innovator's 64K memory concurrently. Memory will be expanded to 256K to meet later

demands. Customers will have essentially unlimited file space, since any one file can be up to 250-million characters, according to the firm.

Call-A-Computer's marketing plans show three configurations of service. Individual console service, for the regular user; in-house concentrator service offering multiples of 20 terminals to the large-volume user; and finally, entire systems for the company that needs a dedicated system of its own.

The Innovator, via terminals, will be demonstrated at booth 8700.



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Reservation System



SANTA ANA, Calif. — Ecotel, a package hotel reservation system, will be the premier exhibit for Electronic Engineering Co. of California at the FJCC.

The system will consist, the company says, of a simple console, containing a mini-computer, a magnetic tape storage device, a CRT/keyboard display, and an I/O typewriter.

Reservations can be booked up to a year in advance; cancellations can be handled; arrival and departure lists for the next day are printed and various management reports detailing the operation of the specific hotel.

Other planned features include: guest history, automatic registration, guest folio posting, city ledger, check-out, house-keeping dispatch, inventory handling, billing, payroll, accounts receivable and payable, and credit-card processing, the company says.

Package Systems on Display at the Fall Joint



Graphics display system is built with autonomous systems structure.

DEC Shows Interactive Graphics Display

MAYNARD, Mass. — An interactive graphics display system, the VT15, is being announced for applications such as graphic research, design engineering, architecture, and business information systems at FJCC.

The display system, which includes a VT15 graphics display processor and a VT04 graphics display console, is being offered by Digital Equipment Corp. for use with their medium-scale computer, the PDP-15.

Like the PDP-15, the VT15 system is built with an autonomous systems structure, claims a company spokesman.

The system can be used as a basic graphics processor, as a terminal with full-field handling capability and rapid turnaround for large systems data processing, and as a device to format and display information from a data file, make changes in the data, and store the information in the file, claims the company.

The VT15 has a standard 17-inch CRT display, a 68-character central hardware character generator, six function buttons, an eight-directional vector, a hardware program counter, and flicker-free characters, the company states.

Options available will include a keyboard, writing tablet, multiplexer, and random vector capability.

Vector Generator

MOUNT KISCO, N.Y. — Information Displays, Inc. will introduce a proportional vector generator for their Idiom interactive graphic display system at the FJCC. This new subsystem represents a substantial improvement in the speed and stability of vector drawing in graphic displays, the company says.

The new proportional vector generator will be available in all future Idiom systems and is designed to be retro-fitted in existing models.

With the vector generator, vectors up to 6.25% of full-screen dimension will be produced at a fixed rate and vectors beyond that point will be drawn at time rates proportional to line lengths. Fixed rate vectors will be drawn at 3.75 msec; vectors drawn at the proportional rate will take a maximum of 50 msec, depending on the proportion of the full-screen diagonal involved.

An important feature of the new IDI vector generator is that it provides uniform intensity for all vectors regardless of length. This is achieved through use of a unique single-loop circuit. This new development also eliminates the need for gamma compensation.

Idiom, with this new feature, will be on display at booth 8200.

ME Demonstrates System

SANTA MONICA, Calif. — Miller-Ellis will demonstrate a computer system with cassette tapes, a CRT display, a modem, an automatic dialing unit, and generalized I/O capability at the company's FJCC booth.

Designed for applications requiring local computing capabilities and periodic access to time-shared computer complexes with central data bases, the system includes multiprogramming software, according to the company.

Typical applications would include billing and accounting, limited process control, computer-aided design, data acquisition, and automated equipment testing.

The company will be in booth 22007.

IDS Memory

DETROIT, Mich. — Head-per-track memories will highlight the Information Data System's booth at the FJCC.

The 7000 Series system, which stores 32K through 256K 8-bit words, has an average access time of 16.5 millicsec. Prices for this unit range from \$1,900 to \$5,100.

The 8000 Series stores up to 140,000 bits with an average access time of 8.5 millicsec. The price for this model is about \$1,300 and 30-day delivery.

Interface controllers for these systems will also be on display.



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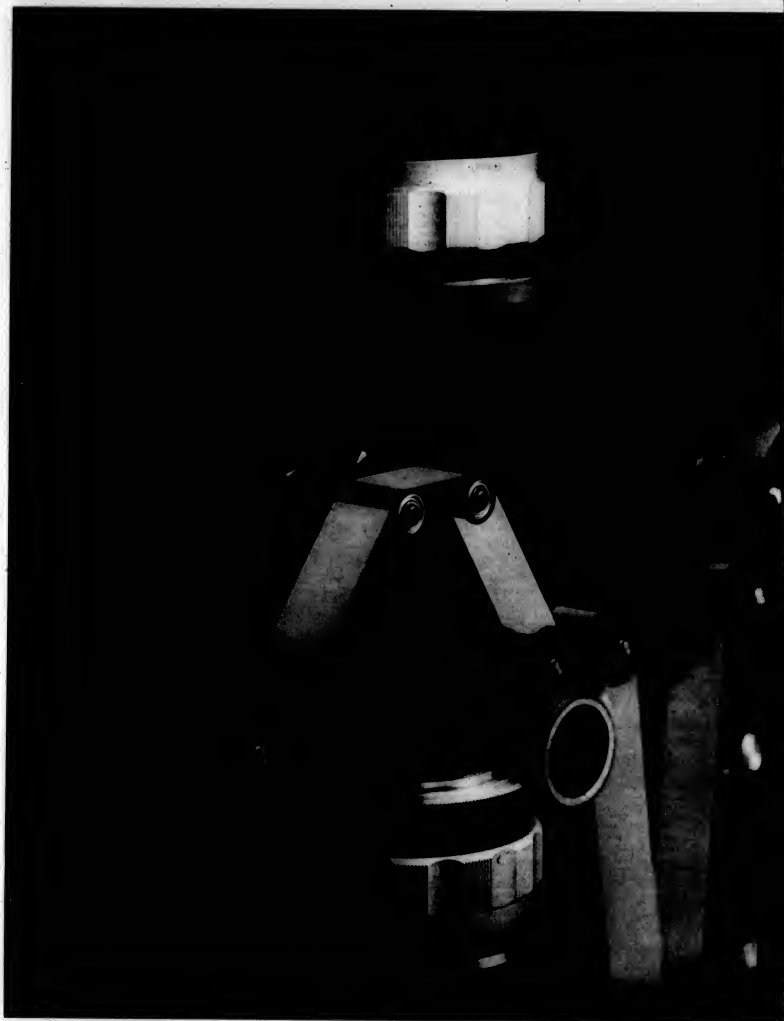
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MEMOREX



ABOVE: Broker uses Telequote III to get last price and current bid and asked prices for AT&T.

LEFT: Device can display stock ticker in vertical format.

BELOW: Telequote III is even finding its way into private homes. Ross Hooker, a private investor who trades for his own account, has one in his home on the shore of Chesapeake Bay.



Desk-top Device Provides Instant Stock Data

By Christine Magnuson
CW Staff Writer

STAMFORD, Conn. — A secretary, a registered stock market representative, or a high school student walking into a brokerage office can, by simply pressing a few keys on a desk-top device about the size of an adding machine, obtain up-to-date stock market information.

The machine, a Bunker-Ramo Telequote III, is also called "the electronic workhorse of Wall Street."

At the firm's New York computer center, a score of ticker lines from all major stock and commodity exchanges input a stream of raw market data. Then real-time computers, on-line to both input and output, turn out a flood of processed data on demand to well over 20,000 Telequote III units installed throughout the country. The information is displayed on 4-in. cathode-ray-tube screens with characters about a third of an inch high.

By punching in a stock ticker abbreviation, anyone visiting or working at nearly all the major brokerage houses can get the closing, opening, high, low, and last price, and in addition can get the volume traded, price-earnings ratios, and dividend data on any listed New York or American Exchange stocks.

The user can also look up the status of popular market averages and indices, find the total exchange volume, tell if the ticker is late, and learn various other market facts — all for a minimum price of \$295 per month (additional consoles are \$35 a month each), plus service charges.

The system, which has been in use since May, 1964, handles nearly two-million calls during a peak hour and over 1.5-billion calls per year. It employs over 80,000 miles of high-speed lines, connecting the main center to 15 satellite centers in 10 major cities that fan out to subscribers in each satellite area.

The user usually gets his answer within two seconds, often one, claims the company. Bunker-Ramo Corp., which owns and operates the entire complex (except for the lines leased from the telephone companies) employs a nationwide maintenance force of 400 up-time experts, schooled in the demands of on-line, real-time systems.

Bunker-Ramo's computer in New York accumulates data from over 50 exchanges. The facility contains three identical Telefile computers specially built by Bunker-Ramo.

Each computer has a memory capacity of 66K of core. Five operators run the equipment during the day, according to Howard Quick, director of the data center. In the evenings, the data bank is updated.

The facility has 10 memory drums with a total storage capacity of 10-million words that are available for access by all the computers. Six tape drives and an interface to the Univac 1004 computer are also components of the system.

Each satellite center contains a Bunker-Ramo-made processor — a wired program machine that receives queries from the Telequote III units in that area and can store data for 16,000 different stocks, dividends, etc.

The 15 satellite centers located in 10 cities include five

(Continued on Page 39)



Next year the New York Stock Exchange will install a computerized system for matching buy and sell interests in large blocks of stock. This Bunker-Ramo 2200 terminal will be part of the system.

20,000 Telequotes Now in Use

(Continued from Page 38)

centers in New York City; two in Los Angeles; and centers in Atlanta, Miami, Dallas, San Francisco, Kansas City, Mo.; Chicago, and Detroit.

Trends

A service, Trends, was added to the Telequote III so that the user can see a continuously updated report of the 10 most active, most advanced, and most declined issues, year's highs and lows, upside/downside data, and Dow-Jones and Standard & Poor's averages.

With Telequote Trends, the data is displayed in a cycle of easy-to-read frames, each of which remains in view for one minute and reappears with any intervening changes after the other five have been displayed.

The same display can be repeated for group viewing on 17-in. CRT monitors.

Mini-Ticker

A live ticker displayed in a vertical book-page format to fit the screen has also been added to the system. A broker with a private cubicle away from the usual boardroom ticker displays may find the Telequote Ticker useful.

The ticker, geared to meet high-speed ticker needs, uses cathode ray tubes ranging in size from 3 in. to 27 in. It prints reports a line at a time, each line staying in place for a minimum of six seconds.

This display of the New York and/or the American Stock Exchange ticker appearing on the Telequote III desk units is called Mini-Ticker.

Telequote 70

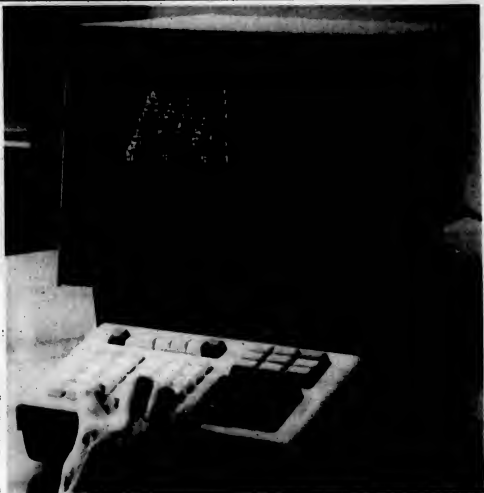
Two years ago a Telequote video unit, described as an "everything box for the brokerage office" - Telequote 70 - was developed from previous Telequote equipment.

The Telequote 70 has two slightly larger screens, which can bring in the quote service, Trends, tickers and the newswires of Dow Jones and UPI.

The new device is also designed to be used for input/output for the brokers' own communications or computer system.

The Telequote 70 and Telequote III are completely compatible. Both work off the same control units that are able to handle up to 30 desk units or large screen monitors or any mix of them within 500 feet of the control unit.

The Telequote 70 is designed for the highly productive account executive who needs to have computer-stored customer account information and back-office research reports, as well as market data information and back-office research reports, as well as market data information at his fingertips. The user of the Telequote 70 can transmit buy and sell orders directly from his desk.



Telequote 70 features twin screens which provide broker with the same display as Telequote III on one screen and information from the broker's own computer on the other.

The data center in New York serves the Telequote 70 system as well as the Telequote III system.

Nasdaq

An automated over-the-counter quotation service will be available from Bunker-Ramo and the National Security Traders Association late in 1970. The system, the National Association of Securities Dealers Automated Quotations System (Nasdaq), is designed primarily to accept and distribute quotations for OTC securities.

Nasdaq will provide Telequote users with a bid and asked quotation on each of 1,200 OTC issues updated continuously.

A number of market makers will enter their bid and asked quotation on each issue, and these identifiable quotes will all be displayed to OTC traders through a larger CRT unit - Bunker-Ramo's Series 2200 CRT terminal. Dual Univac 1108 computers will form the

central facility for the Nasdaq system.

Installations of the Telequote systems have been made in homes, in a university, in offices of industrial executives, in banking trust departments, and in mutual funds offices, according to the company. There is an installation in the middle of Grand Central Terminal in the booth operated by Merrill, Lynch, Pierce, Fenner & Smith.

Telequote III in Broker's Home

Investor Ross B. Hooker, for example, trades in the name of his firm, Hooker Enterprises, Baltimore, from his personal office in his home near Chestertown, Md., with the Telequote III stock quotation device.

Before the Telequote III was installed in his home, Hooker had to spend most of his time in brokerage offices to keep abreast of the latest stock market developments. Now he can transact most of his business over the phone, going to Baltimore for visits with the brokers only a few times a week.

Use of the Bunker-Ramo computer service was approved for Hooker by the New York Stock Exchange through the sponsorship of two Baltimore member firms of the exchange - Alex. Brown & Sons and Robert Garrett & Sons, Inc.

Telequote III Matriculates

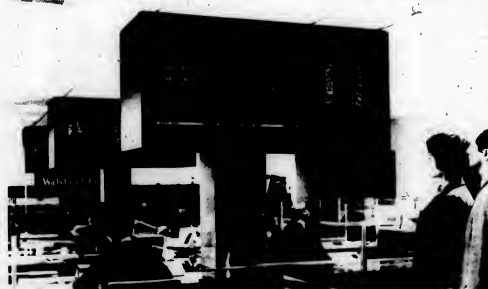
Students at the University of Notre Dame have access to a Telequote III housed in a College of Business Administration building. Graduate and undergraduate students retrieve stock prices from various exchanges, checking their securities and fulfilling assigned projects.

John R. Malone, associate dean of the College of Business Administration, felt that a Telequote III, flashing prices directly from the nation's largest exchanges, would give the students the "feel" and the authentic atmosphere necessary to generate interest and enthusiasm in courses dealing with finance and investments.

On April 24 the Telequote III was put into operation at Notre Dame with prices from the New York, Midwestern, and Pacific Exchanges.

Professor Malone uses the terminal in the 50-student graduate course in business financial management. The device is also used with six classes of basic finance each semester, with a 120-student investments course, and with two research seminar courses.

Business Professor Bernard K. Hildebrand plans to assign to each student three or four securities. He'll probably select his own - many own a few shares anyhow - then he'll file a report on activity and trends.



Large screen display of tickers and Telequote Trends in use in the office of Walton & Co. in Baltimore.

Peripherals on Display in Las Vegas



Gerber System 40 for producing printed circuit artwork.

Gerber Scientific Instrument's System 40 Produces Printed Circuit Board Artwork

SOUTH WINDSOR, Conn. — System 40, a new contouring system that provides electronics manufacturers with complete, one-package capability to produce printed circuit board artwork, will be introduced by The Gerber Scientific Instrument Co. at EICC.

The System 40 price of \$55,000 includes a new table, contouring control, and photohead, as well as a complete printed circuit artwork applica-

tion program package.

Gerber is able to offer the complete system as a package because of the new software program, called Gerber graphics generator (3G), developed by Applied Programming Technology, a subsidiary.

The installation of System 40 provides the customer with a turnkey operation enabling him to produce finished, printed-circuit board artwork from design sketches or drawings, the

company claims. The 3G software program provides the capability to convert geometric data from the drawings quickly and easily into a set of input cards for the system.

System 40 reads these cards and automatically plots high-precision artwork by photographically exposing film or glass within a self-contained darkroom formed by the table's light-proof cabinet. This allows operation of the system in a normally lighted area.

Not only is System 40 designed to draw with accuracies of ± 0.015 of an inch with repeatability of ± 0.005 , but it has a maximum speed of over 100 in./min over the 14 in. by 20 in. plotting area.

A major feature of the system is the capability to produce complex printed circuit masks drawn 1:1, eliminating photographic reduction errors. The sharpness of line quality eliminates ragged edges and permits increased density, according to the firm.

The photohead is mounted to a beam over the plotting table. It has 24 separate computer selected apertures that may flash images or draw lines with sizes from .005 to .250 in.

Standard data input is IBM punched cards from an IBM 024 or 026 keypunch. Keyboard input from an ASR-33 teletypewriter is available as an option.

The System 40 will be displayed at booths 6701 through 6704.

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READOC[®] **A ONE-STOP, ERROR-PROOF, OCR INPUT SYSTEM**

In a major breakthrough Allied Computer Systems introduces ReadDoc for the processing of turnaround billing documents and data entry to the computer. ReadDoc, run by a single operator, is the one stop between mail being opened and the computer.

Reducing today's cost (anywhere from 6¢ to 25¢ per document) to 2¢ per document or less, the savings are obvious. ReadDoc may be leased or purchased. For full information, write:

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Allied Computer Systems, Incorporated
589 Boston Post Road, Madison, Connecticut 06443
Telephone (203) 245-2718



See ReadDoc at ACS Suite, Sahara Hotel, FJCC (Fall Joint Computer Conference), Las Vegas, Nevada

COMPUTERWORLD



WHY STAND IN LINE?
See Page 40D

INTRODUCING THE RAZOR BLADE



See the holder at Booth 600, FJCC.



newell industries

Dual Image... A New Data Entry Media



Your People and Your Computer Can Read It Equally Well

They're Compatible at Last!

Your people and that computer, joined hand in hand. Dual Image, a new concept in remote data terminals, provides a fast, flexible yet low-cost way to bridge the gap between man and machine. The secret of Dual Image is a unique printed tape, which combines both "display" and "storage" in a single durable media. People can read it as easily as the morning newspaper. Computers digest it as simply as data from magnetic or punched tape, CRT's, cards, or typing terminals.

Ten Times Faster Than a Teletype
Operators will find Dual Image perfect for data capture. Each character keyed is immediately visible, just like a type-written line. Data is then transmitted over standard voice grade lines at 120 characters/sec. Your computer gets the most

data per dollar. Since the computer and the keyboard can activate the same printer, both the inquiry and response can be printed next to each other on the same tape...providing a permanent hard copy record too!

Correcting Non-Valid Data — Dual Image Really Shines

Source document errors are quickly discovered using the computer's editorial ability. Data unacceptable to the computer is "returned to sender" with white space replacing questionable data. Correction means simply filling in the blanks, and re-transmitting. No more time wasted in finding that the computer would not accept your input...no more hooking of the right correction to the wrong record. Suspense files are gone...memory needs are eased!

Applications Unlimited

Dual Image is excitingly new! For order entry, sales reporting, branch office accounting. In fact, applications are limited only by the imagination. Write for the whole story. It's in our full color brochure. Or, if your need is urgent, phone us at (206) 774-4156.



INTERMEC

Interface Mechanisms Incorporated
5503 232nd Street South West
Mountlake Terrace, Washington 98043



poor reading habits.





From out of the blue, Honeywell's Mod 4 Operating System.

It's here and it's now: an operating system that executes up to 20 different jobs at once.

That's a real down-to-earth multi-programming.

Mod 4 is one of the outstanding features of Honeywell medium-to-large systems like the 3200 and 4200.

It dynamically allocates use of the computer's resources for increased throughput.

It handles remote and local job entries and real-time inquiry responses concurrently, while the computer is computing.

It's easier for programmers to program.

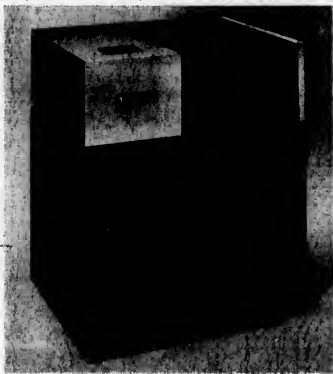
Easier for operators to operate.

Its overhead is low, much lower than what you'd expect for an operating system that boasts such large-scale capabilities.

Not a blue-sky dream. Not a plan. Not a prototype. You can see Mod 4 in action. Right now.

The Other Computer Company:
Honeywell

\$10,000 REWARD!



When you consider the fact that there are no premium charges for extra shift work on the Talcott 9311 Disc Drive, you can quickly calculate even greater savings than this on just a three-year lease. But that's just for one unit. In actual use, you can connect up to eight 9311's to one 2841 Control Unit. They can even be intermixed or directly interchanged with the 2311 or similar disc unit. Complete plug-to-plug compatibility. The Singer Company, Friden Division has engineered the 9311 to give greater reliability—with a unique

servomechanism instead of a hydraulic system. Now consider this: dependable service by the worldwide Friden Customer Service Organization; financial arrangements to give you maximum savings by Talcott Computer Leasing. Ready to "unbundle your 2311's"? Contact your local Friden office or write: Friden Division, The Singer Company, San Leandro, Calif. 94577.



Talcott

TALCOTT COMPUTER LEASING

Division of James Talcott, Inc.

1290 Avenue of the Americas, New York, N. Y. 10019

Peripherals on Display at Las Vegas

Potter to Demonstrate Entire Line

PLAINVIEW, N.Y. — Potter Instrument Co. is planning to demonstrate its complete line of peripheral equipment at this year's FJCC.

End-user equipment will include magnetic tape drives, disk

drives, and controllers for all IBM systems. High-speed printers for use with many manufacturers' equipment will also be on display.

The booth will feature the new Keyed Data Recorder, used for key-to-tape data entry.

OEM equipment to be shown will include tape transports for speeds up to 200 in./sec. with packing densities of 800 and 1600 bit/sec. The new automatic threading units will be included. The display will be at booth 2100.

Clevite to Show 4800-line/min Electrostatic Printer

CLEVELAND — A 4,800 line/min electrostatic printer from Clevite will head up the company's display at this year's FJCC, the company says. Virtually noiseless and using

high-contrast paper that, the company says, won't curl, yellow, or become brittle, the Clevite 4800 can produce both alphanumeric and graphic printouts.

The unit will be displayed at the company's booth 112 and will be used on-line to demonstrate the Adage interactive graphics system at booth 1900, the company says.

So you just got a new Spiras-65 System. More power to you.

Congratulations. You've picked the right computer for the job. Spiras-65. This compact stored program controller/processor packs the most powerful instruction set in terms of core economy and effective speed, to give you unprecedented performance/dollar. That's computer power. And it's all yours, without major options, because all predictable performance features

are standard with Spiras: • Bootstrap loader • Double precision arithmetic • Floating point arithmetic • Hardware multiply and divide • DMA • DMC for 62 devices • Multilevel indirect-addressing to 32K • Relative addressing • 512 words • Immediate instructions • Register copy instructions • Micro-programmable conditional instructions • 1024-word base page • Memory expansion to 65K • Removable I/O control panel with octal data-entry keypad and NIXIE® octal/decimal display • Extensive software package including A.S.A. FORTRAN IV

• A complete complement of peripherals like the IRASCOPE: A CRT display for data base interrogation and editing which provides optimum human interface in terms of visual presentation and keyboard characteristics, as well as interface with any kind of computer or data set. In peripheral equipment, software, hardware, peopleware, your whole Spiras system, you've got all the power behind you.

And all the rewards ahead.

Spiras Systems, Inc. (Formerly IRA Systems)
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(617) 891-7300, TWX 710-324-6699

Visit our booth #8106 at FJCC



Spiras Systems, Inc.
Affiliate of
USM Corporation



Klein Schmidt printer in use in car.

Klein Schmidt Printer
DEERFIELD, Ill. — A receive

only teleprinter that can be used in cars, planes, or trucks will be one of the three printer configurations to be shown at the FJCC this year by Klein Schmidt. The Teleprinter, as the mobile unit is known, types at 75 word/min and requires only 18 watts to operate.

In addition, the M-311, either RO or SR, will be on display. The M-311 can operate at speeds up to 100 word/min and produces the standard ASCII character set, the company says.

The company is also introducing a new table-top acoustical cabinet, to quiet the M-311. The unit is stand-alone, and reduces the noise at least to the level required for the NC-50 standards, the company says.

The equipment will be on display at booths 1308 and 1309.

Cartridge Disk Drive



BERLIN, Mass. — A low-cost random access bulk storage digital disk recorder with average access time of 16.6 msec will be displayed in booth 207 at the FJCC.

Compatible with many small and medium-size computers, the company says the Model DDR-1 is expandable from 32K bytes (8-bit data words) to 512K bytes per side of each disk; and with expander-type slave recorders, to 2,097,152 bytes of fast access storage.

The unit features an interchangeable 14-in., nickel-cobalt plated disk on which data is recorded by fixed read/write heads. The disk is driven by an hysteretic synchronous motor in which the rotor shaft is supported by an air bearing spindle that moves up and down to load and unload the disk.

Each disk is stored in a separate sealed Disklosure. With a Disklosure inserted in the main

(Continued on Page 46)

See the

Data Movers

from TI



look for
The Data Movers
At the Fall Joint
Computer Conference,
Booth 5400, Las Vegas
Convention Center

- Magnetic Tape Units that are plug-for-plug replacements for original equipment in the System/360... they assure better data and longer tape life. Look for **Model 924** Magnetic Tape Units.
- Magnetic Tape Units designed for the O.E.M. with improved reliability, lower routine maintenance requirements and lower cost. Look for **Model 959** Magnetic Tape Units.
- A Data Collection System for gathering management data where it happens, when it happens. You get reliability, simplicity, economy. Look for the **TACTICOM®** Data Collection System.
- Quiet, fast, attractive Electronic Data Terminals to replace complex, noisy mechanical terminals. Compatible with Teletype terminals and IBM 1050. Look for the **Series 720** Electronic Data Terminals.
- Economical, fast, efficient Electronic Message Switching. For systems with from 4 to 128 lines, 5- or 8-level codes; save money, increase efficiency, reduce errors. Look for the **980/EMS** System.

* Trademark of Texas Instruments



TEXAS INSTRUMENTS
INCORPORATED

Peripherals on Display in Las Vegas

(Continued from Page 44)
housing, fluidic logic actuates a picker arm which pulls the disk from the Disklure and positions it in a miniature clean room under the heads.

Options include anticipation logic for programming, format writer, indicator panel, program read, or write lockout, and manual read or write lockout. Custom interface design services are available at moderate cost, the company says.

Off-Line Tape

PALO ALTO, Calif.—A new 25-in./sec tape system for small computers and off-line users will be previewed by Hewlett-Packard at the upcoming FJCC. IBM- and ASCII-compatible, the new tape system, Hewlett-Packard Model 7970A, uses 10-1/2-in. reels and operates with 7 or 9 channels with 800, 566, or 200 bpi density. It uses a dual-gap head for read-after-write error-checking, and has full parity options.

Electronic deskewing, ordinarily found only on costlier systems, is a standard 7970A feature.

Various options are offered. The basic transport is separately available with choice of heads, read electronics, write electronics, density select, unit address, motion control, special cabinetry, etc.

Prices depend upon options and quantities, of course. For a typical 25 in./sec OEM configuration, including 9-channel read/write electronics and full motion control electronics, in OEM quantities, HP Model 7970A prices will be in the \$3700 range. Deliveries are scheduled to begin in the second quarter of 1970.

The equipment will be shown at booth 2000.

Direct-Access Tape

ROCHESTER, N.Y.—A high-speed, direct-access tape transport system for the company's mini-computers will be introduced by Sykes Datatronics, Inc. at the FJCC.

Designated the Compu/Center 100, the cassette-loaded unit features a high-speed, bidirectional, direct-access capability that enables a user to access any file on a tape containing 3.6-million bits of information within an average of 15 seconds.

In addition, the unit is pro-

vided with comprehensive software and complete interfacing to DEC, Varian, and Data General mini-computers, with other interfaces available as an option, the company says.

Read/write speed is 5 in./sec and bidirectional search/fast rewind speed is 120 in./sec. Block length is dynamically variable and is limited only by tape length.

Recording density is 1,000 bit/in. and a bit-serial, biphase

encoded wide field recording technique is used to provide reliability and a tape transfer rate of 5,000 bit/in.

The cassette contains 300 feet of computer-grade tape, preformatted with a copyrighted address track, certified after the tape is wound in the cassette.

Mini-Frisbees

SAN FRANCISCO—Iomega will be exhibiting its first announced product, the Iodisc

Series 1000, at FJCC, the company says.

Actually the company is exhibiting two things, the Iodisc, and the firm's Mini-Frisbees. (Some 60,000 are said to be available at the company's booth.)

The unit, an on-line, mass-memory system, designed for small- to medium-size computers, is made up of disk drives and a storage controller.

The drives, employing single

disk removable cartridges, are used for access to larger volumes of data, on-line storage extension for lower use programs and data, and fast access for high-activity programs and tables.

The company offers two compatible disk drive systems, Iodisc 1012 and Iodisc 1011.

The Iodisc 1012 drive offers a removable disk in combination with a nonremovable disk and is said to store up to 22 million bits of information.

Speed merchant.



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You can now, in many cases, automate your inventory, payroll or other reports for less than the cost:

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Plug in an Amplex ECM to a 380/50 and get almost twice the speed of a 2361 LCS. And even greater speed on a 380/65. Interleave two ECMs and effective throughput can be doubled again. It gives you more time to use for more data processing.

The Amplex ECM is a direct replacement for the IBM LCS. Just plug it in. Absolutely no modifications are required. Mechanically or electrically. And it is completely compatible with existing software.

And whether you lease or purchase, we'll give you complete service. All day, every day.

See for yourself. Ask for a complete list of operational sites.

For last information, contact Amplex Corporation, Computer Products Division, 9937 W. Jefferson Blvd., Culver City, California 90230, a leading world source for core memories, tape memories, cores, stacks and arrays. Telephone: (213) 836-5000.

Your computer counts on us.

AMPEX

Data Entry Devices at the Fall Joint



Technitrend portable data terminal.

Terminal Uses Six Ordinary Batteries

PENNSAUKEN, N.J. — A \$230 portable data-entry terminal that uses six ordinary batteries and weighs only 7-1/2 lb. will have its debut from Technitrend at the FJCC.

Operating over a built-in acoustical coupler, the 16-button terminal which includes six special-purpose keys and ten numeric keys, is designed for use with

audio response units similar to the company's VM-1400. It has an external speaker for receiving the computer's reply.

Optional capabilities include hard-copy printout, specialized keyboards, and packaging for individual customers. The company claims 30-day delivery, with prices ranging from \$230 to \$350, depending on quantity.

Technitrend, Inc. will have the terminal on display at booth 18003 at the Sahara Hotel.

Inforex Key Entry

BURLINGTON, Mass. — Inforex plans to exhibit its intelligent key entry system, a key-to-disk data recording system, at its FJCC booth.

The system consists of a control unit and from one to eight entry stations. Data pooling is automatically done on the disk. The data can, after all verifying, batching, etc., be spooled onto the built-in tape.

The tape can be either 7- or 9-track, with the 7-track BCD and the 9-track EBCDIC.

Prices start at \$590 per month for a controller and one entry station, with an additional \$50 for each station added. The unit will be displayed in booths 8508 and 8509 at the main exhibit hall.

Qantel

PALO ALTO, Calif. — The Qantel V, an intelligent terminal that can also act as a local computer, will be Qantel's entry for the FJCC.

The unit will support various peripherals and can act as a letter writer, an accounting and billing machine, or a Selectric typewriter, the company says.

The unit, selling for under \$11,000, will be on display at the company's suite in the Sahara Hotel.

SEL Keytran

FORT LAUDERDALE, Fla. — Keytran, a data-entry system under the control of a mini-computer from Systems Engineering Laboratories will be on display for the first time at the FJCC.

Up to 48 keyboards may be attached, and data entry is direct to disk, the company says. Data analysis is done through a modified 810B computer, and all editing, verification, searching, and tape output are done through this computer.

Complete software, the company says, is provided for the computer. Some of its capabilities include automatic batch totalling, data insertion, automatic zero balancing, and check digit control.

The unit will be on display at booth 2900.

Meg Tape Encoder

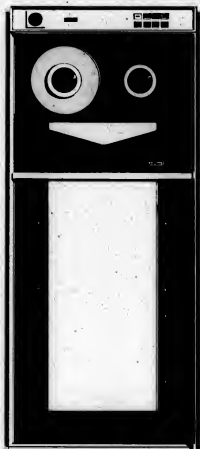
BAY SHORE, N.Y. — A key-board-to-magnetic tape encoding system with unlimited record size, variable record lengths, and standard-IBM-compatible output tapes will be the star of Keymatic's display.

The system can record both upper and lower-case characters, as well as all other possible bit-configurations in the full 256-character EBCDIC code, the company says.

Multipunching for programs is eliminated, multiple field or variable-length data is handled automatically, and data retrieval codes can be entered directly through the keyboard for data base encoding, the company says.

Prices range from about \$8,500 to nearly \$12,000. The unit will be shown at booth 5012.

Perfect match.



Ampex TM-1624/29 tape drives are plug-interchangeable with IBM 2401's and 729's.

In fact, the Ampex TM-16s are compatible in every way — size, hardware, software, diagnostics and operator interface. Just plug them in and start operating. The TM-16 single capstan drive

assures gentle tape handling and easy loading.

Add all this to a cost saving of up to 52% and you can more than meet your data processing goals. And whether you lease or purchase, we give full service, too. All day, every day.

Ampex TM-16s are built with the skill that can only come from a quarter-century of magnetic tape leadership. Switch to our perfect match. You'll be richer for it.

For more information, contact Ampex Corporation, Computer Products Division, 9937 W. Jefferson Blvd., Culver City, California 90230, a leading world source for tape memories, core memories, stacks, arrays and cores. Telephone (213) 836-5000.

Your computer counts on us.

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**AT THE FJCC, WE'LL BE SHOWING WHAT HUMAN
ENGINEERING HAS DONE TO A KEY-TO-TAPE ENCODER**

the other key-to-tape company:



STRAIGHT TALK

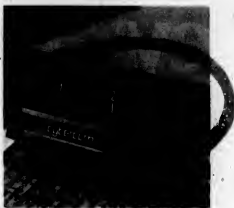
no codes . . . no searching through manuals

Cybercom's Mark I key-to-tape encoder "talks" to the operator by automatically giving a written display of errors and the corrective action to be taken.

If a discrepancy occurs in format or data, the type of error and the corrective action to be taken are displayed simultaneously in plain language for quick operator recovery.

This "teaching machine" characteristic, plus modern styling, tape cassette, quick program card loading, and visible format mapping — all make the Cybercom Mark I the most efficient data entry system available.

And off-line pooling with the Cybercom cassette/tape converter guards against obsolescence if your computer tape is up-dated.



Write for a brochure today.

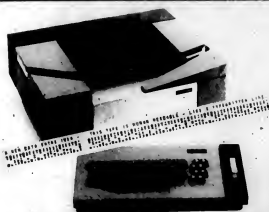
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Data Entry Devices at the Fall Joint



Data entry device uses tape both human and machine readable.

Data Tape Human & Machine Readable

SEATTLE, Wash. — Both human- and machine-readable tape for a data entry and retrieval system are slated for initial demonstration at the FICC by Interface Mechanisms, Inc.

Known as Dual Image, this concept in man/machine-readable media is suited for remote data entry, since information can be entered either at typing speeds via the keyboard or from a variety of digital devices at rates up to 75 char/sec and then transmitted to computers or other standard business machines over data links at speeds up to 1,000-char/sec.

Up to 128 characters can be

printed, and since the last character keyed is visible to the operator, data can be immediately confirmed or errors instantly corrected. This saves verification time and greatly reduces the possibility of incorrect data being transmitted to the computer, the company says.

Other Dual Image features include:

- Asynchronous reading rate of 120 char/sec, which is optimum for transmission over voice-grade telephone lines.
- Unlimited use of white space within the record for punctuating sentences, separating mes-

sages, permitting computer fill-in, writing instructions by hand, signing off records, or adding data at a later date to update or correct the record.

□ Complete modular construction suiting Dual Image for OEM applications since a customer can specify recorders, readers, keyboards, or tape-handling units in whatever configuration required.

□ Simultaneous printing of the human-readable symbol and the standard machine-readable code, making it impossible for the man/machine characters to disagree.

Dual Image units may be purchased or leased; some systems for as little as \$20 per month, according to the company.

Sangamo Key to Tape



SPRINGFIELD, Ill. — Designated the DS7100 or DS9100 (depending on tape tracks), the new Sangamo data station will be on display at the company's booth.

The unit combines alphabetic and numeric keyboards with alphanumeric display, core memory, and 7- or 9-track magnetic tape output. It will be shown at booth 5800.

Datawik

ANDOVER, Mass. — A terminal specifically designed for inventory control, order entry, and data retrieval will be shown by Dasa Corp.

Called the Datawik, the unit costs less than \$1,000 and can store up to \$6,000 numeric characters. The unit transmits over standard data sets, weighs about 13 lb., and features a simple ten-key keyboard.

In addition to the Datawik, the company will also be exhibiting its Datacalc, a unit designed for easy retrieval of often-used tables or data, such as price lists. The exhibit will be at booths 8420 and 8421.

Coordinate Digitizer



SILVER SPRING, Md. — A pencil-following digitizer, the PF-40, is said to convert any type of drawing into machine-decodable data. It will be shown by Edwin Industries.

The digitizer is only a small free-moving "mouse," with all the electronics stored in the table used for digitizing, the company says.

The digitizer will be on display at booth 8401.

The key to success in computing is PEOPLE.

And, Computer Guidance Corporation performs searches for personnel involved in all phases of the computing industry. Qualified professionals that can solve your problems are hard to find.

But, our staff of search specialists who have extensive computing backgrounds know how to find the right professional who can contribute to your company's success—whether it involves manager, salesmen, engineers, or programmers.

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Some are doing plenty right now. You'll see how when
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Booth Resources International, Inc.
Denver, Colorado
(December 1989)



Parts expeditor displays cards and corresponding parts shipments generated by parts inventory system.

IBM Parts Inventory Control System Developed by Field Engineering Division

MECHANICSBURG, Pa. — More than 250,000 parts transactions a week are handled by a new nationwide parts inventory control system developed for internal use by IBM.

With each parts transaction, the computerized parts inventory management system (Pims) posts all resulting changes in its combined inventory file of nearly four million records. It also orders replenishment shipments as needed in distribution centers and branch office stockrooms throughout the nation.

A feature of the system is automatic shipping and stocking of parts needed to insure optimum service for new IBM data

processing products on order by customers. When a product is announced by IBM and orders are placed by customers, Pims forecasts, orders, and ships all parts required to build up local new-product parts stockpiles across the country for maintenance requirements.

The new system manages the varied stocks of IBM data processing equipment replacement parts that are kept on hand at more than 150 branch office stockrooms and distribution centers throughout the U.S. It also maintains perpetual inventory records of parts stored at many customer locations.

The system was developed by

the IBM Field Engineering Division.

Pims is programmed on a 360/65 located at the main IBM Distribution Center in Mechanicsburg, Pa. Capabilities of Pims include:

- Keeping inventory records of parts stocked at IBM and non-IBM locations across the country. (These include 15 intermediate parts centers in major cities from coast-to-coast, as well as more than 135 IBM Field Engineering Division branch office stockrooms throughout the country, and at many customer locations).

- Detecting trends in parts usage and predicting short-term needs for parts stocks.

- Automatically issuing orders to replenish stocks as parts supplies at any IBM location reach reorder points.

- Allowing for a variable "safety stock" of parts in every stockroom.

- Adjusting for differences in shipping time to near and far locations when issuing orders to replenish stocks.

- Keeping supplies of large parts from over-crowding limited branch office stockroom space, while still insuring adequate quantities on hand.

- Minimizing replenishment costs when feasible by ordering several months' supplies of smaller parts to be sent at one time.

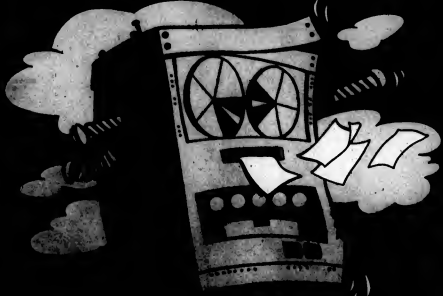
- Predicting long-range needs for stocking parts.

- Automatic and optimized redistribution of field inventory. The entire reports structure for managing the inventory is based strictly on exception/action data. Historical and detail supporting data can be provided on an as-required basis, generally via video output terminals, at the main distribution facility at Mechanicsburg.

An individual parts transaction in Pims represents a single parts movement of any kind — disbursement, redistribution, replenishment, initial supply, and so on.

The system was developed for IBM's internal inventory management needs.

Too much program for your computer?



Try FASBAC

FASBAC is the name of a new and dramatically different remote computing service available from University Computing Company. This service is designed to overcome a basic limitation in standard time sharing capability: the inability of many systems to accommodate computer programs of substantial size over standard teletypewriter equipment.

With just a standard teletypewriter terminal in your office, FASBAC permits you full access to the speed and power of an ultra-large UCC computer located in a Computer Utility Center. There is no restriction on program length other than that of the central computer's memory; you have complete

use of all high-level programming languages and applications packages through your desksize terminal. In addition there are special edit and conversational languages to make FASBAC even more convenient and effective.

What all this means is that your processing problems can be handled swiftly and conveniently on a UCC computer through FASBAC. The quick response and rapid turnarounds available through the FASBAC service are now enjoyed by many companies and individuals across the country. Right now there's simple capacity in the UCC Utility Centers to handle all your pressing computing problems, regardless of size. You won't have too much program for our computers. For further information on FASBAC, simply write or call: FASBAC, University Computing Company, 1948 Stemmons Freeway, Dallas, Texas 75207 (214) 741-5781.



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With a little Bit of luck.

The new Bit 483 mini computer is not lucky. It's a machine with about as much daring as a hammer.

We designed quiet, dull reliability into the soul of our new 483. And then we started stamping out that soul like cookies. If anything was a gamble, that was. But then, a guy named Ford kind of took the initial risks on mass-production.

He showed that mass-producing something like the 483 would allow us to deliver the 483 yesterday. And that producing in volume would allow us to discount the price.

Putting your money on the 483 means putting your money on a general purpose digital computer with proven

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Jet Engine Turbine Blades Designed On CRT Screen in Tenth Normal Time

INDIANAPOLIS, Ind. — Computer-created images are being used to assist engineers in designing gas turbine components for jet engines at the Allison division of General Motors Corp. here.

Blade design, Allison says, is now accomplished in one-tenth of the time needed for conventional methods.

Engineers communicate design decisions to the computer through lighted areas of the terminal with a photoelectric light pen. These lighted areas have predefined meanings, allowing the engineers and computer to attain a dialogue.

Stored programs then display design information on the screen of the terminal, an IBM 2250

visual display unit. The system required to afford this design capability is called Remote Access Procedure for Interactive Design (RAPID).

This company-developed system allows the engineers to enlist assistance from a network of many complex computer programs, involving more than 45-million instructions, stored in the remotely located computer, the firm said.

William Elliott, chief of mathematical sciences, said the system allows aerodynamic engineers to design a gas turbine with the desired airflow, heat transfer engineers to cool critically heated parts of the engine, and structural engineers to determine proper

materials consistent with stress and vibration levels.

"These results are accomplished without manual transfer of design information among the departments," he added.

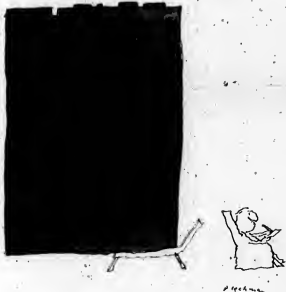
Consistent engineering information and engine parameters are stored in the communication network of the system allowing engineers to spend their time on creative design, according to Elliott.

"In this environment, each element of the design cycle does what it can do best. Man contributes sound engineering judgment and the computer supplies instantaneous results of analytical calculations," he said.



Heat transfer engineer Bill Kilmer uses light pen in the design of internal cooling passages of a turbine blade for a jet engine.

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Computer-Aided Design Used for CATV Circuits

ANAHEIM, Calif. — Computer-aided design of CATV equipment can help optimize system performance for a particular circuit configuration, according to Anaconda Electronics Co.

Gaylord Rogness, director of engineering, said that there are three distinct advantages in applying computer-aided design techniques to CATV equipment: determination of limits of performance, design reproducibility, and application to hybrid and integrated circuit design.

Rogness added that computer-aided design, in essence, boils down to the too often neglected theoretical design approach vs. the "on the bench" design approach. To illustrate the difference between these approaches, he discussed the classical constant resistance equalizer design problem.

In this problem, the goal is to design an equalizer circuit with a minimum insertion loss at one end of a given frequency band. In addition, the circuit's attenuation must result in the flattest possible frequency response.

Rogness explained that the designer begins with a known generator and load impedance and a known cable attenuation characteristic. His initial design

can then be selected by "pulling a rabbit from a hatful of experience," which is often justifiably done, or by using more elegant theoretical techniques to select a minimum value of insertion loss and determine the equalizer frequency response. At this point he has determined a set of circuit element values.

The designer must now select his route to the final circuit design. Rogness said he can use the laboratory "screw-driver adjustment" method and adjust component values until he arrives at a combination which meets the specifications. Or, he can use a computer to adjust element values to obtain the optimum design.

If the designer selects the computer route, the determined circuit still must be built and tested in the lab. But there are several advantages to this route: optimum performance is known before the circuit is built, and the circuit design can be checked over a frequency range to determine effect on component tolerances on performance.

Important CATV product areas where this design approach can be applied, said Rogness, are amplifier design and hybrid circuits for miniaturized broadband amplifier circuits.

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Species of Natural Life Classified by Computers

LAWRENCE, Kan. — "The revolution the computer has brought in taxonomy, or scientific classification, has only just begun," said Dr. Robert R. Sokal, professor of biology at the University of Kansas.

A numerical taxonomy team has used IBM computers and advanced classification principles to account for and identify species of plant and animal life. "Traditional classification schemes are based upon one or a very few characteristics," Sokal said. "However, the computer can assess a multitude of characteristics. Obviously, the more characteristics of a single specimen used for classification, the more exhaustive and accurate classification becomes."

The numerical taxonomy system works as follows: Scientists choose a variety of characteristics; each characteristic is assigned a numerical value; varieties within the characteristics are further assigned values from one to 10; and unclassified specimens are described numerically and compared with patterns of values previously cataloged to identify the unknown specimen.

For example, the length of the spinal column might be one characteristic assessed. The digit "0" might be assigned for spines less than 12 in. long; "1" for 12-18 in.; "2" for 18-24 in., etc.

"Coupled with many other characteristics, the numeric value of spine length can be interpreted by the computer as it assigns classifications to unidentified specimens," Sokal said. "Or, spine length can be used in cataloging a known specimen."

"Whatever the use — classification or identification — computer-based recognition is the wave of the future. It removes subjectivity from the most critical scientific activity and adds a degree of precision not formerly present."

Initial K.U. numerical taxonomy research was conducted on an IBM 650, then a 1620, and a 7040. Mushrooming interest has produced more than 800 scholarly papers on the subject and more than 300 applying numerical taxonomy to diverse groups of animals.

"In the past," Sokal said, "similarities in assumed evolutionary patterns were used for classification. Genes also were studied as possible keys to classification. But common ancestry — real or presumed — and the manifestations of genetic code at particular moments in time are misleading, rather than precise, measures. The only assumption numerical taxonomists must make is that it is possible to assign numerical values to varying degrees of similarity."

"We believe our experience has shown this assumption to be valid and numerical taxonomy to be a success."

The same techniques used to classify plant and animal types are useful for a variety of other classification jobs. Numerical taxonomy has been used to organize soil types, disease symptoms for diagnosis, political blocs and legislation, archaeological artifacts, socio-economic analysis of neighborhoods, television audience program preferences, psychological types, and linguistic patterns.





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Auto Parts Lists To Be Replaced With Microfilm

DENVER, Colo. — Two 8-mm microfilm cassettes — each slightly larger than a deck of playing cards — and a small desk-top satellite reader will be field tested to replace the six-foot-long set of catalogues used by automotive parts jobbers throughout the country, it has been announced by Information Handling Services (IHS), the information retrieval division of Indian Head Inc., and the National Automotive Parts Association (Napa).

For the past 18 months, Napa and IHS have been developing a means of replacing the bulky, 85-lb. Napa catalogue with a microfilm information retrieval system. The catalogue is updated four times per year.

The new system will be offered to the more than 4,000 Napa jobbers after field testing around the country.

The microfilm system merges Napa's methods for displaying and formatting their products with the computer and publishing capability that IHS developed to produce Visual Search Microfilm Files for engineering parts specifications in the defense and electronics industries.

Each 8-mm cassette can hold as many as 4,400 images containing information on specifications, availability, and prices of the more than 84,000 parts produced by all Napa suppliers. A Napa jobber would be able to retrieve the information at a far faster pace than with the 12,000-page set of catalogues, and bring the jobber significant cost reductions in locating parts information.

Napa suppliers will provide computer-readable technical data to IHS. This information will be converted through computer-based optical scanning for storage. At the same time, it will be indexed within the computer for retrieval.

"This multimillion dollar system will represent a major information handling advance in the automotive replacement parts market, because the Napa-IHS system increases the speed at which our jobbers would be able to serve their customers with up-to-date information," said J.R. Degnan, Napa's vice president and general manager.

Richard H. O'Brien, president of IHS, said, "IHS's experience in handling a large volume of technical data will allow us to provide accurate, on-time updating for Napa jobbers."

The National Automotive Parts Association provides the automotive jobber with a single source of supply for obtaining automotive replacement parts. Napa consists of 54 automotive parts distribution centers, located throughout the U.S.

Information Handling Services, a division of Indian Head Inc., is in the field of microfilm publishing. IHS produces and markets automated information storage and retrieval systems.

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Listings of Ships Within Given Sea Area Aid Coast Guard in Emergency Operations

NEW YORK — At Coast Guard headquarters on Governors Island a computer is a frequent participant in dramatic events at sea.

Amver (automated merchant vessel report), a system that runs on a Coast Guard-owned IBM 1401 computer, processes voluntarily submitted sail plans of merchant vessels, then keeps track of vessels during their voyages by computing their positions. The computer can predict a vessel to be within 50 miles of her actual position roughly 90% of the time — no small feat considering wind and current effects.

A Surpic (surface picture), the computer's output, is a listing of ships and their rescue capabilities that will be found within a given area at a given time based on most recent data. Surpics are furnished only to recognized search and rescue agencies for emergency purposes, or on a precautionary basis for such events as the Apollo splashdown, long overwater flights of President Nixon as well as of foreign heads of state upon request, and the Ben Franklin's Gulfstream research mission.

A Surpic can prove extremely valuable should an unforeseen emergency arise. Many merchant vessels are well equipped for rescue operations and are often closer to a distress scene than rescue ships. Knowing who and

where they are enables a rescue center to be certain that only a vessel with the necessary potential is called upon to render assistance.

Amver, a service offered free of charge to participating merchant vessels, is international in scope, receiving data from ships of over 65 different nations. Similarly, the benefits of the system's output are made available to search and rescue agencies of any nation for bona fide emergencies. Should the Apollo astronauts land in other than the prime recovery area, Amver could scan the seas for the best source of help. Similarly, Amver's electronic system enables Air Force One's pilot to know of every

merchant ship he will pass over or near en route, for aid if an emergency ditching should ever become necessary.

In another area, as the Ben Franklin performed her underwater drift marathon, the surface vessel-tracking her was kept on Amver's plot. Meanwhile the Franklin's crew, at the whim of the Gulfstream currents, studied their characteristics.

However, the greatest use is made of Amver information to aid merchant vessels. Whether the problem is illness, taking on water, or a fire, Amver will be able to perform its complex acts of memory and trigonometry, and locate the nearest vessels in order to help those alone at sea.



Members of the watchstanding crew at work in the U.S. Coast Guard's Automated Merchant Vessel Report Center

Sports Schedules For Youth Group Done by Computer

FALLS CHURCH, Va. — Inter-Active Computing, Inc., working jointly with PRC Computer Center, Inc., both located in Northern Virginia, has donated the time and effort to produce a scheduling program for the Catholic Youth Organization (CYO).

Developed by Bill Haardt and Mike McCall of IAC and Joe Haardt of PRC (all area CYO coaches), and with the cooperation of Paddy Kane, the CYO athletic director, the program is capable of scheduling all the CYO's yearly sports activities. The CYO has over 700 teams and supports over 15,000 student-athletes in the greater Washington area. One of the highlights of the program is a geographic schedule which places teams in certain sections of the city at the closest fields available.

The schedule for fall sports, including touch and tackle football and soccer, has proven to be a tremendous time saver to both the CYO and the coaches, the men say.

Give it to your boss before he gives it to you.

MEMO

TO: M.R.
FROM: J.S.
SUBJECT: Communications System Reconfiguration
DATE: October 1, 1969

I've been doing some analysis on the system reconfiguration we've discussed and thought you might be interested in the results.

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PROPOSED LAYOUT

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TOTAL MONTHLY COSTS FOR CURRENT SYSTEM: \$1100 x 4 lines = \$4400

TOTAL MONTHLY COSTS FOR PROPOSED SYSTEM: \$1100

SAVINGS PER MONTH WITH PROPOSED SYSTEM: \$4400 - \$1100 = \$3300

TOTAL COST OF CODES CT-4 TERMINAL (AS-96, TM-4)

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Please return with your comments. *J.S.*

WJ/jm

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38 Police Agencies Have Quick Access To Joint Set of Stored Police Records

CINCINNATI — Two RCA computers and a network of 80 communications terminals are being used by the city-county crime information system, mutually shared and financed by government agencies of 38 different jurisdictions.

The Clear (county law enforcement applied regionally) computer regionally is the heart of a regional center for centralized information services that provides quick access to police records by any of the 38 police agencies in Hamilton County, including the city of Cincinnati.

Besides serving in a local capacity, the system also is tied into the FBI's National Crime Information Center in Washington,

D.C., and with the Ohio State Highway Patrol Computer Center in Columbus, Ohio.

Now under development is a plan which eventually will link the Cincinnati-Hamilton County Crime Information Center with the systems in neighboring Kentucky and Indiana, forming a tristate intelligence network to share files through computer to computer communication.

The nucleus of the crime information system is formed by two RCA Spectra 70/45s. The system also includes 18 RCA Video Data Terminals for sending and receiving information from the computer, 34 automatic send/receive teletypewriter terminals, and 28 receive-only teletype-

writer terminals.

A.O. Atkinson, superintendent of the Cincinnati-based computer center, describes how the crime information center functions: A police officer signals a speeding motorist to pull over to the side of the road. As the car slows down, the officer notes the speeder's license plate number and radios it to the computer center for checkout.

An official in the center enters the plate registration number into the computer via video data terminal. Within seconds, the desired information is flashed on a terminal's screen. It is then relayed to the arresting officer in less than it took for the officer to stop the speeder and ask him for his driver's license.

The information would include a complete report of vehicle registration; car serial number; the owner's name, address, and traffic violation record; and other pertinent information, such as whether the vehicle is stolen or whether the driver is wanted in connection with another crime.

Additional information maintained in the computer file includes such records as warrant wanted; temporary felony wanted; guns and stolen property; wanted persons for whom a warrant has not been issued (run-aways, Awd, etc.); and known police characters including gang members, paroles, sex, and narcotic offenders. These records can be obtained directly from the computer using both video data terminals and teletypewriter terminals.

Besides serving in a crime information capacity, the Cincinnati-Hamilton County Regional Center for Centralized Information Services handles virtually every county administrative activity. This includes computer information processing of records ranging from hospitals and libraries to public utilities and courts.

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Texas Updates Files

Clerks use CRT terminals to update Texas motor vehicle title and registration information. The Texas Highway Department now uses two IBM 360/50s for this purpose.

New York City to Index 6,000 Miles of Streets

NEW YORK — Some 6,000 miles of New York City streets will be classified and the information fed into a computer when the city's highways department initiates a planned street index and inventory system in early 1970.

New York Transportation Administrator Constantine Sidamon-Eristoff said the computerized system will have an important role in the highway department's proposed five-year improvement program for local streets and major arteries.

"In the planned street-index system, all pertinent data and statistics concerning the city's streets, including approximately 120,000 blocks and intersections, would be fed into the

computer and stored," Sidamon-Eristoff said. "This information would be made available at all times to city planners and engineers."

The input data will include street dimensions, grades and curvatures, street classification, traffic count, accident rates and construction history — date of latest paving, type and condition of existing roadway surfaces, frequency of maintenance repairs, and utility cuts. Other inputs will involve the locations of utilities, ownership, and mapped street widths, he said.

Sidamon-Eristoff, who also serves as highways commissioner, added that "such a system could result in the offering of invaluable assistance to many city agencies. The outcome of this move, no doubt, could result in a large saving of tax dollars."

Davis Computer Systems, Inc., was contracted by the city last May to do a \$30,000 seven-month study of street indexing and other computer-based systems that might lead to more efficient use of highway department resources. Another part of this study is the investigation and development of a maintenance scheduling system. This would result in improved efficiency in scheduling street repairs.

"This system, once developed, would be most valuable in providing a departmental guide for planning pothole and other maintenance work on a rapid and complete basis," the commissioner pointed out. "It has the potential of increasing the efficiency of this operation."

"The scheduling system would bring to the department's attention the remaining number of potholes to be done, and centralize this information for the most efficient deployment of manpower, materials, and equipment," he said.

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State Employment Service Uses Computer to Match Jobs, People

MADISON, Wis. — A computer system has been designed to find jobs for job-seekers in the Madison area.

Called the employment service on-line placement system (Eops), the service consists in an IBM 360/40 that contains records of applicants and job openings filed with the Wisconsin State Employment Service's Youth Opportunity Center and adult office in Madison.

Interviewers use TV-like communication machines to talk with the Eops computer to find appropriate jobs for people looking for work.

The State Employment Service, a division of the Wisconsin Department of Industry, Labor and Human Relations, developed Eops under a U.S. Department of Labor grant.

The Eops system classifies applicants by worker characteristics expressed in terms of education, vocational training, aptitude, and interest. Available jobs are grouped by function and level of complexity rather than by industry or job title.

Frank Walsh, employment service administrator, said Eops compares applicant characteristics with job categories that re-

quire those characteristics. Results are flashed to the interviewer on the terminals. The interviewer then relays the information to the applicant.

"Before Eops," Walsh said, "our placement specialists had to search manually through work order and application files to find jobs for applicants. This method was time consuming and frequently proved fruitless, and the follow-up system to see if applicants were hired was cumbersome. In many instances delays resulted before the applicant was placed."

"Eops will eliminate the weaknesses of the old manual system. It lets an interviewer and an applicant consider every job possibility related to the applicant's abilities, needs, and potential for training with fantastic speed and accuracy."

A job seeker in Madison can use Eops at either the Youth Opportunity Center or the adult employment service offices. He completes an application form. A placement specialist interviews him and records skills, experience, education, interest, need for training, hours and wages wanted, personal, and other data.

The interviewer enters the data into the 360/40 by means of a

keyboard attached to his visual display terminal. Each office has seven.

The computer compares the profile of the applicant's characteristics against those segments of the job order file that specify similar characteristics. It then displays to the interviewer the appropriate data on up to five job possibilities. If none is available, the computer so indicates and the interviewer instructs the computer to search related areas of interest for the applicant.

All information about applicants and job orders is stored in computer disk. The computer periodically reviews the applications of people who have not yet found work. It also alerts interviewers to new job opportunities that were not listed at the time the job seeker made his application.

Interviewers are also alerted to the names of persons consistently unable to find a job. Plans then can be made for special job training for those individuals.

Other states testing computer use for employment services include Florida, Maryland, New York, California, Utah, and Michigan.

Eops plans to extend coverage to Milwaukee as soon as possible.

Wisconsin State Employment Service interviewer uses a computer terminal to help job seeker.

Air Reservation System Answers Menu Questions

LOS ANGELES — Reservations agents have a computer memory aid that helps them answer questions ranging from "Can I rent a car at the airport when I arrive in Calgary?" to "What will the menu on my flight be?"

Questions asked by passengers and potential passengers are fielded routinely by Western's agents by using the direct reference system (DRS) in the airline's IBM 360 computer.

The system was designed by Western when it ordered its computer several years ago. IBM worked out the programming and technology. DRS has been in use by the airline since its "Accu-Res" reservation system went into operation a year ago. DRS has not only eased the agent's burden of having to memorize a maze of complex fares and other details, but also offers the customer far better service, according to Western.

Previously, information had to be retrieved by flipping through manuals, bulletins, and other assorted papers. This took time and effort, and information could not be kept up to date as quickly as in DRS, the company says. Without DRS, it was simply impractical to make much of the information available.

"In addition to providing better service, we can translate DRS into direct sales," says Harley Robertson, Western's director of on-line information systems. "We get many calls, for example, from people planning a trip — say for December to Acapulco — who are just looking for information."

"If they don't make a reservation on that call, we take down their name and telephone number and as December approaches, one of our agents will call them to inquire if they are still planning a trip to Acapulco

and would they care to make a reservation? It works."

As well as storing information on meals, car rentals, and fares, DRS provides access to the latest company information bulletins, hotel space availability in certain cities, tariff rules, weather and ski resort snow conditions, and other information.

The reservations agent merely types into the set the appropriate code for the information being sought. The answer is flashed almost immediately on a video screen above the keyboard. The agent can then read the information directly to the caller.

According to Robertson, the uses of DRS are almost limitless. "We've hardly scratched the surface," he said. Western is working on making it possible for agents to have the system quote fares between any number of cities on the airline's system.

For example, an agent may be asked how much it would cost a family of four to fly roundtrip, first class, family plan, between San Francisco and Mexico City via Los Angeles, taking in Las Vegas on the way back. The system will be able to return the answer instantly and accurately.

Another potential use being studied by the airline is to store management information in DRS. This could include financial information, traffic data, and the like, Robertson said, but because of possible confidential nature of the data, access to it would have to be restricted.

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Computers Used to Control City Traffic Entering Freeways; Accidents Decrease

DALLAS — A number of U.S. cities are turning to digital computers to help smooth out traffic snafus, reduce stop-and-go traffic, and cut down on accidents.

Detroit and Houston are using IBM 1800 data acquisition and control systems to regulate traffic lights at on-ramps leading to heavily traveled freeways.

In Houston, the computer controls traffic entering a congested portion of the Gulf Freeway. By means of sensing devices buried in the freeway pavement, the IBM system detects gaps in approaching traffic.

Dr. Johann Buhr, research engineer on the Houston project, explained, "When an approaching traffic gap is detected, the computer turns an over-ramp traffic light green so that a motorist reacting in an average manner will reach the freeway at the right time to merge into the gap."

With computer control, he said, driving speeds at peak periods have increased 30% and the accident rate has been cut nearly in half.

The more recently installed system in Detroit controls entering traffic along a section of the Lodge Freeway.

San Jose installed an IBM computer to control traffic signals in a portion of the downtown area.

The project started as an experiment, but proved so beneficial that it became a permanent system, city officials reported. San Jose's computer keeps track of current traffic conditions — again using sensors in the pavement — and synchronizes the traffic signals to permit the most efficient vehicular flow and minimum of stop-and-go conditions, IBM claims.

New York City began using an IBM system in early May to control traffic signals along the 11-mile Northern Boulevard, a main artery in the Borough of Queens. City officials said the computer has reduced driving time at rush hour by 35% and the number of stops by 70%.

By the end of this year, city officials expect to bring 500 traffic lights in Queens under the computer's control. "The purpose is to enable traffic to move more efficiently so that our streets can make their maximum contribution to the transportation of goods and people," said Theodore Karagheuzoff, New York City traffic commissioner. "Reductions in running time and stop result in improved automobile engine efficiency and a consequent reduction in exhaust fumes," he said.

Wichita Falls, Texas, connected 77 traffic lights to an IBM 1800. City engineering officials there said the computer has helped cut the accident rate and aided in reducing by nearly 15% the time a car waits for a light to turn green and by nearly 17% the number of times a car must stop while traveling through the downtown area.

Austin, Texas, linked an IBM computer to 42 traffic signals in the University of Texas area. City Manager R.M. Tinsman said the computer is "informed of any traffic demands and can

respond by changing traffic signals to keep cars moving." Over the next few years, Austin plans to tie in over 200 traffic signals to the computer.

Portland, Ore., and Baltimore County, Md., have also received systems and plan to complete their installations within the next few months. Portland's computer will synchronize traffic lights in the downtown area and Baltimore County's will control traffic in the Towson section of the county.

Dallas plans to install a computer to control traffic entering the crowded Central Expressway and to synchronize traffic signals on the adjacent city streets.

The Dallas system, being funded by the U.S. Department of Transportation, will be a pilot program to determine the feasibility of coordinating both freeway and city street traffic with a single computer.

Other cities are in various stages of planning for a day when they can switch on a computer and reduce traffic problems, IBM reports.

"The computer is without a doubt the best tool available today for the foreseeable future to help improve our congested transportation systems," says IBM's Ozzie Berman, program manager for traffic control in Washington, D.C.

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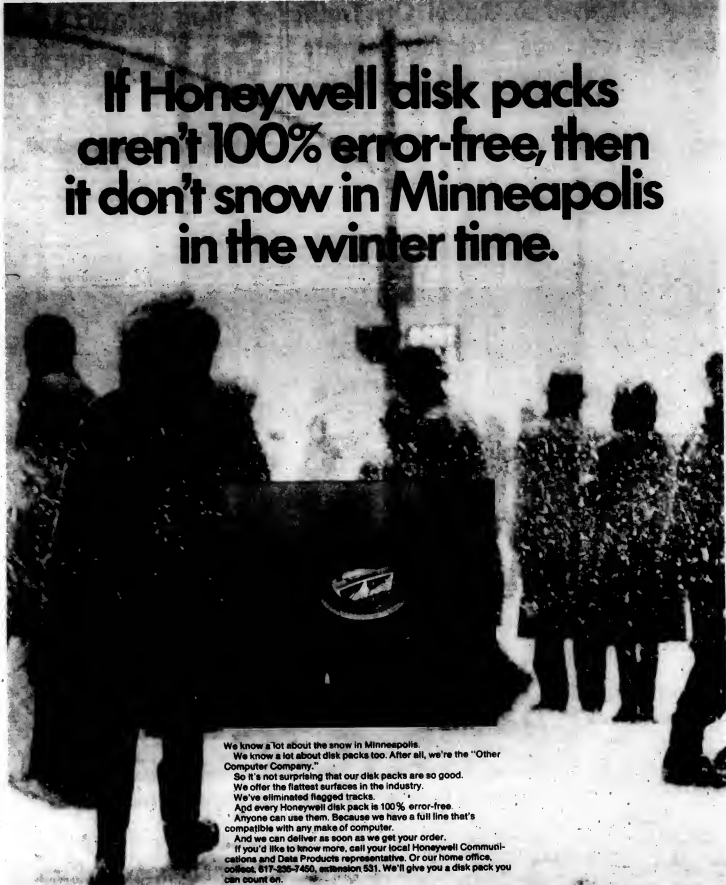
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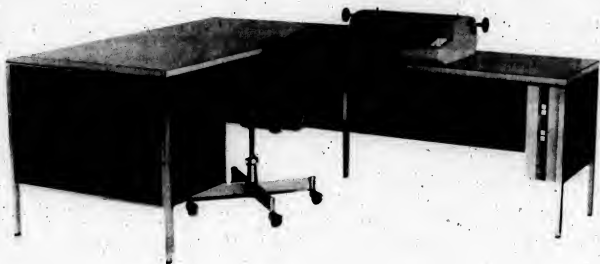
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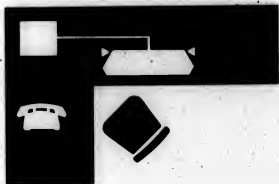
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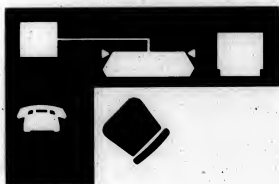
Qantel Configurations



4K — 8 bit word Business Processing Unit

I/O typewriter

Communications interface

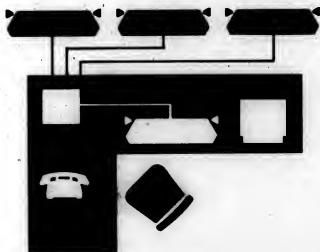


4K — 8 bit word Business Processing Unit

Paper tape reader/punch

I/O typewriter

Communications interface



8K — 8 bit word Business Processing Unit

Paper tape reader/punch

I/O typewriter

Communications interface

Additional typewriters

Keypunch keyboard and ball

Applications

You can use the Gantel V as a terminal—on-line or store and forward. It can save keypunching time and costs by hooking up its paper tape reader/punch. Or, you can use it as a small-scale stand-alone digital computer—in as many applications as you can dream up.

We figure it makes a powerful billing/accounting machine. And the way it turns out mass, personalized mail makes it a natural for marketing applications. You can use it in the plant, in the office, in the computer room or off at remote sites.

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Specifications

The Gantel V incorporates a terminal and a small-scale stored program digital computer with a straightforward, decimally oriented instruction set and flexible I/O interfaces.

Memory is magnetic core, 3.5 microsecond full cycle, field expandable from 4096 8-bit words to 8192 8-bit words in 4096 modules. Control is effected through one microsecond MOS/ROM with 1024 ROM words, standard. The terminal consists of an IBM 735 Heavy Duty Selectric with a 14.6 CPS output; a communications interface to any standard modem and an associated controller. Also available is a 50 CPS paper tape reader/punch that uses standard eight-level USASCII code format.

Software

In addition to a macro and micro-program assembler, software is available for major applications. Full software support is supplied for automatic letter writing, automatic billing and data concentration. An automatic edit feature was developed by Gantel to permit a typist to backspace, retype over existing errors and run error free copies.

Standard utilities, such as "stand-alone" dumps, selective dumps, program traces and other programming aids are available with the Gantel V system.

Options

The basic system gives you a small basic processing unit, a terminal, and communications capabilities. You can beef up the memory, add additional typewriters, put on the paper tape reader and punch, design your own program boards and place them in main memory.

Planned increases in system capability will be modular.

Prices

The stripped Gantel V—consisting of a 4K—8 bit word computer, an I/O typewriter and communications interface costs \$11,250. You can lease it on a 24 month basis for \$275. Maintenance contracts are available.

You can add a paper tape reader/punch for another \$2,050 (\$50 per month); additional 4K memory for \$2,150 (\$49 per month) and consider other options based on your applications, like an additional heavy duty I/O typewriter for \$3,150 (\$85/month).

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- Performance measurement as a design tool
- Management implications
- What types of personnel are required to make effective use of these tools?
- Role of performance measurement and simulation in the overall systems management problem

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Computer Simulates A-Blast, Designs Doors, Missile Silos, Steeples,

PHILADELPHIA, Pa. — The system mathematical-built by the Overly Engineering Co. for use in the design of missile silos and other structures.

For the blast-resistant design of a steel plate and into the 1130 as specifications and characteristics.

Information, the simulates types and of steel plates to be other instructions the unit.

For the computer to final design for the Herbert Wehe Jr., president, "we instruct the computer to simulate the forces as great as an and at varying distances of approach.

Produce Smog

MONICA, Calif. — That many parts of will be artificially a computer as part to control the pollution.

The system Development here will be working a nine-month contract from the National Pollution Control Administration. SDC will devise a mathematical model used to simulate the actions that produce photochemical smog.

to Mel Weisburd, project director, the model will help national officials determine what areas are being polluted and may have photochemical smog. The model will show smog is carried away by wind and air.

added that pollution model would use the model to predict smog before it becomes a problem in an area. The model will analyze air data to determine the makeup of smog and compile a master document related to smog and control.

The model would be used to determine at what point a city might have smog. The model would then aid in its control.

The model would be used to determine at what point a city might have smog. The model would then aid in its control.

The master document will contain the entire photochemical smog model, from its formation to its effect upon human health. The work would continue to help officials determine the control and reduction of smog.

The National Air Pollution Administration is a part of the U.S. Public Health Service, Department of Health and Welfare.

"The intensity of the blast depends on the performance tests, a computer-controlled plotter produces a finished drawing for inspection by engineers. The system also produces a punched tape to control machine tools used to make the doors.

"Creating and testing of doors on the computer," Wehe said, "helps us to avoid over-designing by coming up with a unit that meets optimum weight, thickness, and protection requirements at optimum cost."

Overly also manufactures church steeples and other architectural structures. "By designing steeples by computer, we save one-third of the structural steel weight needed for a 2,700- to 3,500-pound structure," Wehe said. The 1130 determines how strong steeple structural supports must be to withstand weight and environmental forces.

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"By designing steeples by computer, we save one-third of the structural steel weight needed for a 2,700- to 3,500-pound structure," Wehe said. The 1130 determines how strong steeple structural supports must be to withstand weight and environmental forces.

The computer is programmed to determine dead-load and wind-load characteristics for all structural geometrics and heights. The resultant design calculates allowable and maximum stresses using various structural components.



Inside a new church steeple, welder Sam Schreengost connects computer-designed sections.

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Behavior of River Predicted to Help Prevent Flooding

IOWA CITY, Iowa — Research engineers at the University of Iowa are using a computer to help map the Missouri River bed in an attempt to better predict the river's behavior.

Sonic soundings of bed elevations taken at closely spaced horizontal intervals provide a detailed numerical profile of the ever-changing topography of the ripples, dunes, and bars in the river bed.

The project is sponsored by the U.S. Army Corps of Engineers, Missouri River division, which operates the dams on the Missouri. The Iowa Institute of Hydraulic Research at the University of Iowa is gathering and interpreting the information.

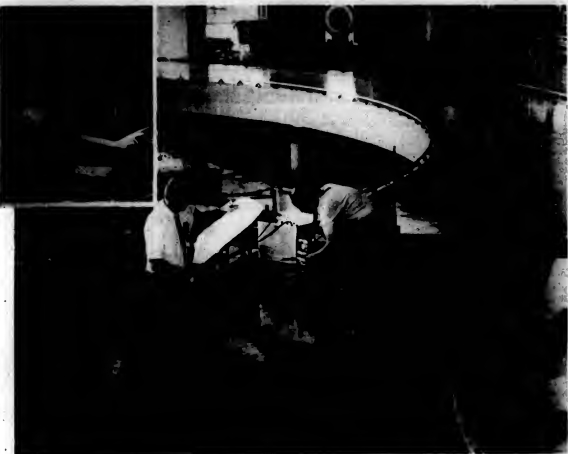
Prof. John F. Kennedy, director of the institute, said the study should make it easier to control the river for navigation and lead to development of better flood control programs.

"The engineers want to know how the river bed profile influences the river depth accompanying a given flow rate," he said. "The ripples and dunes on a river bed change constantly as the depth and velocity of flow and the water temperature change. The river depth, in turn, varies as the dimensions of the ripples and dunes change."

"If engineers better understood the relationships among these changes, they could better judge the effect on downstream river depth of water discharge from the dams," Kennedy said. "This in turn, might make it easier to control floods, and to maintain the required seven-foot navigational depth without discharging excessive water from the dams."

Kennedy said the difficulty in predicting the river's behavior is illustrated by a recent attempt to increase the flow depth to meet the navigation requirement. Normally, he said, releasing more water from the dams would have been the answer to increasing the depth.

"This time, however," he said, "the increased discharge resulted in obliteration of the ripples and dunes and smoothed the bed. The result was lower resistance to the flow of water, enabling the large water discharge to flow at an even smaller depth than



University of Iowa researchers study a model of the Missouri River. In this experiment, scientists measure the depth of the

had accompanied the smaller flow rate."

To study the effects of riverbed configuration on flow depth, the engineers built a 120-foot-long model of a meandering river. It is used to study the effects on flow depth of the ripples, dunes, and bars in the model under varying flow.

"We initially measured the data by hand, which was time-consuming and required laborious manual work," Kennedy said.

"Testing our theories on the Missouri itself requires even more countless thousands of calculations. Our project would be

Impossible without the IBM 1800 to do the arithmetic for us."

The research engineers now gather information on several mile-long stretches of the wide Missouri. Using a boat equipped with sounding devices, they bounce sonic waves off the river bottom, measure the time elapsed from sending a signal to the return of its echo and calculate the depths accordingly.

A magnetic tape recorder installed in the boat records data on bed elevations, information on the boat position, and velocity distributions.

Hundreds of passes made by

river near Omaha and then analyze the data (inset).

the boat are producing voluminous amounts of information. All of it is fed into the IBM 1800 for processing and transfer of the data to punched cards. Statistical analysis of the data is later accomplished on an IBM 360/65 at the university's computer center.

One goal of the project is to understand more accurately the relationship between river depth and water discharged from dams upstream. This would help engineers to better meet demands placed upon rivers.

This study is being directed by Dr. William W. Sayre, Dr. John

R. Glover and Kennedy, with the assistance of several graduate students. Robert Livsey and Donald Bondurant of the Army Engineers' Missouri River division, Omaha, are also involved.

Weekly News Column Analyzes Sports Data

NEW YORK — A syndicated newspaper column, "The Sports Computer" by Bud Goode, provides a weekly computer analysis of sports statistics generated by a Univac 1108.

Goode combined his abilities in computer applications and sports in over seven years of study and research to perfect the sports computer.

His column includes such information as why teams win or lose, forecasts of pro football races and baseball pennants, which playing techniques are important, the importance of bases on balls, and the important plays in pro football.

Thousands of statistics have to be fed into the computer. For example, 80 variables for each pro football team are used every week.

In baseball, 6,000 at-bats for each team in a season, over 600 runs, 1,500 hits, 2,200 total bases, 50 hit batsmen, 475 bases on balls, and 950 strikeouts have to be considered.

Even the most astute sports fan cannot retain all the items that the sports computer has stored in its memory.

Computer System Aids Diagnosis for Pelvic Surgery

BOSTON — A system designed to assist in differential diagnoses for pelvic surgery at the Tufts New England Medical Center has been found to have the same degree of diagnostic accuracy as other, noncomputerized methods used in major teaching hospitals, according to Dr. Peter W. Neurath, assistant professor in the department of therapeutic radiology at the Tufts University School of Medicine and coinvestigators Kurt Enslin and Dr. George W. Mitchell Jr.

Successful implementation of this system will, the researchers hope, "pave the way for its adoption by other centers for the use of the same or similar methods in other, perhaps even more critical, areas of differential diagnosis." Neurath said that the system could be applied in any area, of diagnosis. He hopes that

it will be used in gastro-intestinal analysis.

The computer system helps make nine common differential diagnoses for pelvic surgery. It was designed in three parts: a data-collection procedure, based on a checklist of hospital patients' symptoms obtained on admission; a statistical diagnostic algorithm, for which medical records of more than 500 patients were used to calculate the necessary coefficients; and a computer-based information output which, "using the first two parts, gives the physician a condensed history and the most probable diagnoses before surgery."

The statistical analysis was done on a CDC 6400, and the coefficients were used on an IBM 360/30, according to Neurath, a physicist.

He explained that the three immediate outputs of the computer were designed to meet the needs of the surgeon, "and thus help the introduction of the whole system into the daily hospital routine."

Short-range objectives will provide: information of immediate usefulness to the operating surgeon — i.e. a complete list of relevant symptoms; copies of a neat, computer-typed medical history for the surgeon and his associates within one hour of submission of a checklist; and a computed differential diagnosis, printed and delivered with the history — one which lists the numerical probability of each diagnosis that exceeds 0.1 and the prevalence of that diagnosis as a percentage in the population used for these calculations.

Neurath's interest in pattern

analysis incited development of the diagnostic system.

He and his associates visualize for the future a computer-based "information-collection system that will store a complete set of relevant data and enable rapid retrieval and analysis of any portion at will."

The investigators also see as a long-range objective improvement of the discriminant function and testing of its error rates against new but compatible data. Another goal is determining the minimum list of symptoms needed to make a differential diagnosis of desirable accuracy with attendant saving of time and cost.

Development of the computer system program described by Neurath and others was aided by the Atomic Energy Commission, Division of Biology and Medicine.

NRC Studies Nuclear Magnetic Resonance With a PDP-8 L-Based Analysis System

OTTAWA, Canada — The National Research Council's applied chemistry division recently purchased a computer-based data acquisition and analysis system from Digital Systems Associates, Ltd. of Ottawa (DSA) for nuclear magnetic resonance (NMR) research.

With the development of the PDP-8/L computer manufactured by Digital Equipment Corp., it is now possible for the NMR researcher to apply a low-cost computer to on-line data acquisition in the study of nuclear magnetic moments.

Tedium Taken Out of Product Cost Estimates

BELLWOOD, ILL. — A computer at Taylor Forge, Inc., is taking the tedium out of product cost estimates and is making the firm more responsive to the needs of its customers throughout the nation.

The maker of pipe and pipe products uses the system for some 100,000 analytical decisions on each of 1,350 special items monthly.

R.L. Oden, vice president for engineering, said, "Since using the computer in the process, we have cut the time involved to analyze each request from two days or more to a few minutes of computer time."

Because Taylor Forge operations involve nine plants in eight states plus the Bellwood headquarters, the company must analyze plant capacity, manpower, equipment, and capability before assigning an order for production, Oden said. Even more critical in many cases are decisions on whether a given location has the machinery to make the product to custom specifications and tolerances, he said.

The company's IBM 1130 takes about 30 seconds to compare an order with preset judgment factors. The computer reports which plant can best do the job for the least cost, offers a second plant choice, provides a drawing of the product with all necessary measurements, and prints a routing schedule listing the manufacturing operations needed, he said.

Taylor Forge provides standard and specialty forged products including flanges, pipes, and welded fittings in a vast range of shapes and sizes.

In a few months, the firm plans to expand its computer use to include computer-aided engineering work via a light pen and an IBM 2250 display unit. An engineer will be able to draw a product's picture on the screen with the pen. The computer will analyze the drawing, calculate exact dimensions and specifications, and display its answers on the screen alongside the drawing.

In addition, the computer will merge drawing data with the same special order request information compiled under the existing program to complete the engineering and production analysis process, Oden said.

In this NMR facility at the National Research Council (NRC), a researcher is using a PDP-8/L-based NMR system designed, built, and maintained by DSA.

The system has been designed to do weighted signal averaging. This allows averaging without overflowing memory, at variable sample rates from one micro-second per sample to a few samples per second. This allows the chemist to average phenomena occurring from very fast to very slow rates on the same system.

This wide sampling capability is due to the special hardware designed and built by DSA in consultation with an NRC re-

searcher who is presently using this system for wide line NMR, EPR, and pulsed NMR.

Special software was designed to analyze data acquired on Varian Associates wide-line NMR spectrometer. This software includes programs to perform integration; second-moment calculation; and simulation of Gaussian and Lorentzian curves to compare the line shape.

The system is also being used to acquire data from pulsed NMR (spin echo) spectrometers, where decays as fast as four or five microseconds can be sampled and then analyzed by fast Fourier transform, according to DEC.



Researcher Dr. Garg in the applied chemistry department at the National Research Council in Ottawa uses this PDP-8/L-based data acquisition and analysis system.

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14 Hospitals Now Store Records in Central Computer

BRAINTREE, Mass. — Fourteen hospitals of the Massachusetts Hospital Association recently completed installing computer terminals to give them instant access to a large Honeywell computer complex where all their patient records will be stored, according to Martin McDonough, MIT's assistant director and head of its data processing division.

The data processing division was formed in 1967 with seven hospitals cooperating in the creation of a computer center. Currently services are provided to 28 hospitals totaling 5,000 beds.

"The new on-line computer service will allow the hospitals to create a patient's record, enter accounting data whenever necessary, and retrieve the information for the patient as he is

discharged," McDonough said. "One of the key objectives in the system is to improve patient service and at the same time simplify discharge procedures in hospitals," he added.

The computer automatically will do the posting, filing, and review of pricing, billing, and insurance pro-rata for each hospital. Room, board, and ancillary fees, such as laboratory and department services, also will be included as part of the computer operation.

The computer link-up of 15 hospitals is an extension of patient-accounting services offered to all participating hospitals since the division was formed two years ago, McDonough said.

Patient accounting has been the primary area for develop-

ment, he said, because "it represents the largest single portion of hospital accounting costs."

McDonough said most hospitals supporting the development of the data processing system have under 300 beds and in many cases could not individually afford the system nor the staff required to run it. The two computers — a Model 1200 and a smaller 200 — at the heart of the system, cost close to \$1,000,000. The association leases them for about \$20,000 per month, McDonough said.

"The shared approach toward hospital computerization has some distinct cost advantages," he added. One of the largest hospitals, with over 350 beds and a \$6.3 million budget, spends about \$50,000 — less than one per cent — for its EDI

services each year. Another 40-bed hospital averages about \$12,000 to \$15,000 for the same data processing services, he said.

"One thing the computer will not do, however, is stop the spiraling increase of medical

costs," he added. "It may slow down increases but the bulk of a hospital's operating budget is for labor requirements which can be as high as 60%. To date, there have been no studies made in applying the computer in this area."

Mental Symptoms Compared To Stored Descriptions

ROCKFORD, Ill. — One of Illinois' newest mental health facilities is testing computer-aided diagnosis of mental illnesses.

At the H. Douglas Singer Zone Center, an IBM 1130 compares a given patient's pattern of

symptoms with prestored descriptions of disorders to indicate the most probable diagnosis for that patient.

"Earlier this year, we began testing the computer as an aid in diagnosis with the goal of improving the reliability of the diagnostic process and, ultimately, the choice of optimal treatment for each patient," said Dr. W.G. Smith, deputy director of the center. "The goals of the study reinforce those of the Singer Zone Center itself — treating patients as effectively as possible and shortening the period of treatment whenever and however possible," he said. Smith noted that previous studies have shown a high degree of concurrence between psychiatrists' evaluations of patient disorders and computer-suggested diagnoses. "Of course, the final diagnostic decision will always rest with the doctor. We hope to make the computer a valuable help in making that decision, though," Smith added.

The experimental system works as follows: A trained staff member interviews each new patient and completes a detailed rating sheet describing the symptoms and their severity. Interview data is punched onto IBM cards and entered into the computer. The 1130 system compares patient data with patterns of symptoms prestored in its electronic files.

The system contains 38 symptom patterns recognized and defined by the American Psychiatric Association. Completing its electronic analysis, the 1130 prints a report specifying in order the three most probable diagnoses and the likelihood of each.

Comparing computer-based findings with his own diagnosis, the psychiatrist assigned to the new patient gains either reinforcement of his judgment or new ideas for possible diagnosis and treatment.

"Diagnosis can be difficult, since similar symptoms occur in many disorders," Smith said. "Psychiatrists can use the computer to assess more precisely the importance of each symptom and, perhaps, to diagnose the illness in a more systematic manner."

The Singer Zone Center is one of eight centers operated by the Illinois Department of Mental Health.

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Can Computers Predict Changes In Heart Patient's Condition?

DAYTON, Ohio—Specialists at the Cox Heart Institute have enlisted a computer in a search for medical "indicators" that will telegraph or predict in advance adverse changes in the condition of hospitalized cardiac patients.

The computer, an IBM 1800 data acquisition and control system, also is being used to provide continuous monitoring of patients in a coronary intensive-care unit—alerting attending nurses in the event of any significant changes.

Cox Heart Institute, founded in 1964 and supported by private and government research grants, is operated in conjunction with the Kettering Hospital, an adjacent 400-bed facility.

Cox Institute's patient-monitoring computer is linked to heart patients at Kettering via bedside sensing devices that continuously monitor such vital signs as arterial blood pressure, central venous pressure, the heart pumping rate, and cardiac output.

Measured results are continuously transmitted to the 1800 computer which, every 20 seconds, compares these results to what is considered acceptable or normal conditions under the circumstances. In the event of any abnormal trends in the patient's condition, the 1800 provides this information on a nurses' central monitoring console in Kettering hospital.

The nurse then may alert the attending physician or take corrective action depending on advice by the doctor.

Dr. Paul Kezdi, director of the

institute and a noted heart specialist, said that work being done with the patient monitoring system is giving doctors new insight into cause and effect relationships of heart disorders.

"One of the objectives of this research project," he said, "is to isolate what is described as a 'universal' indicator. This should tell us a change is about to occur."

"Once we define such an indicator, we will be able to exercise greater control over a seriously ill patient's condition. Theoretically, we should be able to sense an abnormal condition early enough to prescribe medication and arrest a problem be-

fore further heart damage occurs."

Kezdi explained that the center is now monitoring six vital indicators on patients of Kettering to detect any change in their condition. "Since we are monitoring multiple factors, we cannot monitor as many patients on the computer as we will in the future."

"By using a universal indicator monitoring approach, we should be able to significantly increase the number of patients on the system. In the event any patient's condition changes, we could quickly switch back to monitoring multiple indicators to ascertain as much about his condition as possible."



Communications control station at Kettering Hospital in Dayton, Ohio links heart patients to a computer at nearby Cox Heart Institute.

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READER

Engine Plant Expects Special Computer To Double Engine Test Cell Utilization

NEW CANTON, Ohio — Direct computer control that is expected to double utilization of engine test cells is scheduled for an engine manufacturing plant under construction here for Hercules Engine, Inc., a subsidiary of White Motor Corp.

The computer system, a Bailey 855, is being manufactured and supplied by Bailey Meter Co., Wickliffe, Ohio. Twenty test cells will be under control of this system by early 1971, with plans calling for eventual expansion to 50 cells to accommodate maximum planned engine production.

In addition to data acquisition and performance testing, the computer will control throttle position and dynamometer load in each cell through two loops of direct digital control (DDC) per cell.

Tested in the new plant will be White's four series of diesel and gasoline engines for farm equipment and heavy-duty trucks. Each test cell will accommodate, at random, any of 25 types of engines in the White series.

According to White, engine turn-around time in test cells will be approximately 1½ hour, doubling the normal industry-wide test cells utilization rate of 15-20%. Contributing to this boost in utilization is the use of digital techniques that minimize the time required for data acquisition and performance calculations, and the preheating of engines which permits quick-coupling, White said.

Once an engine is connected in the cell, the attendant simply inserts into a slot a punch card that accompanies the engine. The computer then automatically puts the engine through its test procedure. This includes automatic start-up, restart if the engine stalls, control of the warm-up period, cycling engine speed, loading, and shut-down. Through control of the engine throttle and dynamometer excitation the computer will constantly make adjustments based upon the comparison of what the operating conditions should be by program reference to what they actually are.

While only simple instructions are available to the test cell attendant, more detailed information is available to a specially trained attendant in a central control room. He has access to information from all of the test cells on demand.

To confirm the feasibility of computer control in this type of application, a "pilot model" system was installed in one engine test cell at White's advanced products division in Torrance, Calif. This pilot study also helped resolve a few sensor/computer interfacing problems, simplified studies on the possible effects of environmental noise, and aided in software debugging, White said.

A number of test programs developed by Bailey are included in the automatic test procedure. Continuous programs include executive monitor, data acquisition, guardian monitor, and engine control. Batch-type pro-

grams, which may be used a number of times during a test, include initialization, engine start, emergency stop, engine restart, engine acceptance, engine stability, calculations, and printer.

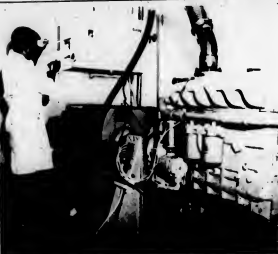
In the White installation, as many as 12 instrument readings can be obtained from each engine. Performance then will be calculated in terms of corrected brake horsepower and specific fuel consumption.

The requirement to conduct tests at specific B.H.P. ratings made desirable the automatic control of throttle position and dynamometer load. The DDC loops utilized permit closer regulation than manually adjusted

analog setpoints. The digital computer also minimizes the time required to attain engine stability at which point engine acceptance data may be obtained.

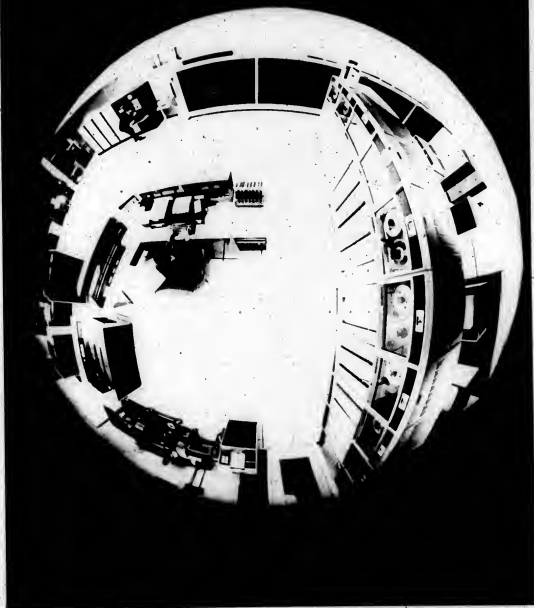
Once the engine is coupled and the attendant inserts the punch card, the appropriate test program is automatically brought forward from memory and initiated by the system to conduct start-up and testing phases.

Through a readout device at the cell, the system advises the attendant what adjustment to make, such as idle setting, and in which direction to make it to quickly achieve an optimum setting.



A White diesel engine is checked out in a computerized test cell at the Advanced Products Division in Torrance, California.

There's a big new





Charles E. Long, president of Compute Air-Trans Systems, stands with one of the firm's contracted "air-taxi."

Cats Will Guarantee You an Airplane

KANSAS CITY, Mo. - No matter where you are, no matter where you want to go, they will guarantee you an airplane within two hours.

While the veteran air traveler may look askance at this pledge, Compute Air-Trans Systems, Inc. (Cats) of Kansas City set out last month to make good on the promise with a new reservation service. So far it covers only the central Midwest.

Cats is raking \$1 million now - with \$10 million soon to follow - on the theory that 100,000 business travelers and thousands of mini-airlines will be happy to be brought together, according to Charles E. Long, 30, Cats president.

"We are not an airline and not a travel agency. We do not own any airplanes and have no plans

to buy any. Our business is to bring together travelers and airplanes - anywhere, anytime."

To schedule a flight, the traveler - who's been issued a no-cost or obligation "U-Write-N-Fly" ticket - makes a toll-free call to the Kansas City Cats computer-facility and states his travel requirements.

With the customer on the telephone, the Cats reservationist processes the request into the computer which holds data on airline routes, schedules, fares, and aircraft inventory. The reservationist receives almost instantaneous computer confirmation, which is relayed to the traveler.

Before hanging up the telephone, the traveler fills in his own ticket which his later presents at the boarding gate.

Cats places the necessary reser-

vations with all participating airlines, trunk carriers, or Air-Trans carriers. The traveler is billed later.

Long said Cats has developed an "all-the-way-by-air" method to provide effective and efficient utilization of privately owned unscheduled aircraft. Often called "air taxis," these planes now operate between numerous airfields throughout the United States.

Prior to the formation of Cats, an individual who wanted to fly from one city to another via air taxi paid a round-trip fare since the plane returned to its home field, whether the passenger did or not.

"Cats will institute one way fares for this service, eliminating layover and ferrying charges," Long noted.

He said the management group directing the new firm includes executive talent from the airlines industry, general aviation, and the computer field.

The firm's system will encompass 10,000 American cities and communities and 500 commuter and air-taxi carriers.

Long said a mini-operation of the system, servicing 200 cities and towns between Kansas City and Denver with 30 aircraft provided through contracts with 35 air taxis, was initiated Oct. 1.

He said an IBM 360/30 with four CRT terminals, had been installed, but already the need for a larger system was evident.

Long added the mini-operation will be run for the last quarter of this year and the first quarter of next and that a market research model is being built before letting out national hardware and software contracts.

Within two years the system will be expanded to serve more than 4,000 airports across the nation. Anticipated 1972 employment is estimated at 500 persons, many of them technical specialists.

The cities and towns most frequently used by air taxis generally are not on the schedules of the major airlines.

Such planes usually are for hire to transport people or freight between two such locations or to fly a traveler to a trunk line point from an outlying area. Currently, a traveler in need of air-taxi service has to make his own flight arrangements.

While Cats will engage major, regularly scheduled airlines where convenient, it also will use a wide variety of aircraft throughout the country.

Long said only carriers conforming with specifications and regulations set forth by the Federal Aviation Administration and the Civil Aeronautics Board are being signed to contracts.

He emphasized that Cats would book flights only on approved Air-Trans carriers (air-taxi, charter flights, commuter airlines) and only on federally inspected multiengine aircraft.

"The crews and maintenance staffs are skilled and experienced," Long said, "and the aircraft are both clean and comfortable. Not all air-taxi pilots and operations have met our standards, and we won't use them until they do."

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An IBM video display helps bank and corporation tax returns.

Video Displays Aid Tax Return Processing

SACRAMENTO, Calif. — A video display system is helping California Franchise Tax Board personnel process bank and corporation tax returns.

"With California's tremendous growth, the record-keeping involved for 200,000 banks and corporations would become unmanageable without the new system," said Martin Huff, tax board executive officer.

Instead of filing once a year, as do the majority of California wage-earners, many banks and corporations are required to make two-installment tax payments before filing their final returns.

This year, bank and corporation tax information processed by two IBM 360 40s can be retrieved instantly and displayed on any of 24 terminals. To

change or update a file, a clerk or auditor need only type in the information on a keyboard beneath the display screen.

"By eliminating trips to and from the files, the display system increases the productivity of processing clerks two to four times," Huff said.

The system also reduces identification problems and errors and enables the Franchise Tax Board to give banks and corporations rapid certification of tax returns, he said.

This year, the State of California expects to deduct almost \$400 million from bank and corporation taxes.

Computer Helps Fairchild Meet Federal Deadlines

ST. AUGUSTINE, Fla. — A computer is helping Fairchild Hiller's Aircraft Service Division meet federal government deadlines to modify, repair, and overhaul hundreds of military aircraft.

The division's St. Augustine facility specializes in major aircraft modifications, including conversion of Fairchild C-119 cargo carriers into electronic-laden, night-flying "gunships" used for close-in support of ground troops in Vietnam.

Other service facilities are at St. Petersburg, Fla., maintained primarily for depleted maintenance of C-130 aircraft, and Crestview, Fla., where the major workload is maintenance of Fairchild-built F-105 fighter-bombers and F-102 delta-winged interceptors.

Russell L. Smith Jr., manager of systems and data processing, said that government contract deadlines could never be met without benefit of computer-oriented systems.

"The material control system alone, which handles every material transaction from ordering through the inventory cycle to issuance, involves many thousands of transactions per month," he said. "Perpetual inventory records are required on more than 50,000 different aircraft parts and daily communications with Air Force logistics systems is required to assure that fly-away schedules are met."

The IBM 360/25, which stores inventory data on disk, keeps records of all invoices, receipts, stock replenishment, and adjustments and statistical data on stock usage, ranging from small bolts to an entire aircraft wing. "The computer can retrieve any of this information within seconds," Smith said, "and we obtain a daily progress report on each aircraft and the specific work being done that keeps us on schedule."

Computer-stored information makes it possible to prepare pre-punched requisitions for replacement parts from government stock depots and receive them in plenty of time to avoid work delays.

"Previously," Smith said, "we used hand-written requisitions that had to be processed into punched cards at government offices before they were sent to stock depots. By doing this processing here, we have improved turnaround time on parts by as much as seven days."

Joe W. Gurnow, division director of marketing, said the data processing system allows administrators to develop accurate cost figures.

"Every aircraft we service is different," he said. "We must estimate our own materials list for repairs and maintenance and be prepared to supply the military with as much information as we possibly can on the work being performed."

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RAYTHEON

Personality Through Handwriting Can Be Computer Analyzed 75-90% Accurately

CHICAGO — A professional scriptanalyst, Charles Martin, has teamed up with a mechanical pen-pal, the 360. The Handwriting Computer Center can produce handwriting analysis that is from 75-90% accurate, he said.

To the expert, Martin said, your handwriting is an accurate guide to your personality and your capabilities. To his computer, the way you dot your i's and cross your t's is part of a huge information bank where the professional can get quick and highly accurate clues to your character.

An analysis that formerly would take an expert several days to complete can be done in a matter of minutes with the computer, Martin said. He added that although a personal handwriting analysis would normally cost as much as \$150, the "just-as-accurate" computerized study can be made for \$10.

After programming thousands of pieces of information about important handwriting factors into the computer, Martin claims to have developed a method whereby an individual's graphic characteristics can be told to the

machine, which then is able to print out an accurate personality profile.

"Handwriting is as unique as a fingerprint," Martin said, "and it reveals to the expert not only what kind of person you are but it gives clues to what you may become."

Although your writing may appear to change from day to day, it is actually your mood that changes while your basic handwriting characteristics remain the same, Martin said.

Among the factors considered by Martin and his computer are letter formation, slant, shading, pen pressure, patchings, and retracings, smoothness, regularity, rhythm, angularity, symmetry, flourishes and ornamentations, spacing between letters and words, and arrangement of the writing on the paper.

"The graphic gesture and expressive movement of the pen often solve many problems of human relations and give one the ability to understand others as well as himself," Martin said. Martin, a chief criminal probation officer for the seventh judicial district of Illinois, has often

been called upon for expert testimony by district attorneys of many counties throughout the state.

His services have been used to identify signatures on wills and in criminal trials, and he is a consultant to many industrial firms and insurance companies.

As a handwriting expert, his services are utilized by credit companies to check credit risks and has been helpful in pinpointing emotional problems of the writer.

Martin, who teaches handwriting analysis at Springfield College, Springfield, Ill., claims that he can tell your boss if he should fire you, your fiancée whether she should break the engagement, or the bank whether it should turn you down for a loan — all from the way you write.

As a result he is increasingly being called upon by major corporations as a consultant on the hiring and firing of personnel and by banks and credit agencies before they make loans.

Handwriting, he said, is just as accurate as Cattel's personality test or a Rorschach psychological test.



Scriptanalyst Charles Martin, vice president and director of research for Handwriting Computer Center, Chicago, waits for a "personality profile" to be printed out by the IBM 360 computer. Thousands of individual handwriting characteristics are stored in the machine, which enables it to aid the professional scriptanalyst by giving fast, accurate reports of a person's character and aptitudes.

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Computer to Serve University Needs

BRIDGEPORT, Conn. — The University of Bridgeport has developed a dual-purpose computer system that serves both its administrative and academic sectors.

The NCR Century 200, with a 64K memory and three dual-spindle disk units each with an average access time of 45 milliseconds, provides for a "partitioned system" in which one portion is set aside for academic problems while the other simultaneously provides for administrative problems.

Thus, each will be able to tap the system — the students and faculty for a fast turnaround on academic problems and the administration to draw from the computer files at random to analyze the makeup, in various formats, of the student body

and staff.

"The university's needs are quite diversified," explained Henry Heneghan, director of Bridgeport's computing center. Therefore, whatever they may be, the computer system must be prepared to serve.

Heneghan predicted that the system would fill all administrative and academic requirements.

On the administrative side, for example, the university is building a data base profiling each student from pre-admission through graduation and into the professional world. The information, in precise detail, will be stored in the computer systems and available at random on demand.

Similar bases will be constructed on graduate students and the

500 full- and part-time faculty members. "In this respect," Heneghan declared, "we are trying to develop one integrated system."

From an academic standpoint, an expandable library of 60 computer programs in mathematics, business, engineering, and statistics has been assembled, published, and made available to students and faculty. As the need arises, others will be written and added to the computer file.

At present, psychology and education, along with engineering and mathematics, utilize most of the computer time allocated to the academic community. But other disciplines are learning to apply the system to their needs and soon will demand more access.

For instance, the physical education department is using the computer to analyze its program, evaluating student performances at the beginning, midway, and at the end of the course.

Besides being capable of handling the immediate needs of both university communities, the system is sufficiently flexible to permit Bridgeport to reach out into other areas.

Finally, the Century 200 provides the university with the opportunity to serve as a resource center, assisting schools, hospitals, research institutions, and other nonprofit organizations in study projects.

For example, six school systems already have made tentative plans to install classroom terminals linked to Bridgeport's computer system. As part of the program, the university will train the teachers as well as maintain the system.

Eventually, terminals will be spotted around the campus so that the administration, students, and faculty will have a direct line to the computer. With the system's multiprogramming capability, access will be concurrent with batch processing.

There also is room for expansion. There are plans to add another 64,000 characters of memory, another dual disk unit, and a communications multiplexer to handle 12 remote terminals. Being a modular system, the system can easily absorb these new features.

60 Cameras Cover Apollo's Liftoff

CAPE KENNEDY, Fla. — A computer made it possible for people sitting at 163 TV monitors in the NASA Launch Control Center to pick up the picture from any one of the 60 cameras that covered the Apollo 11 liftoff.

The switching system is part of an operational TV system, said to be the world's largest such system, at Apollo Complex 39.

The system was developed by the Convair division of General Dynamics, incorporating a Varian Data 6201 computer.

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Two students read computer printout as they work out program at University of Bridgeport.

HAVE MORE TIME TO SHARE

Tempo's New Communications Concentrator can put more customers on line, reduce line costs and improve efficiency of your main time-share computer. It can operate with a variety of terminals, as well as most computers. The concentrator is made up of a TEMPO I Control Processor (with high rate input/output and eight interrupts), two 4K x 16 primary memory units, a communications multiplexer and a synchronous modem controller. The communications multiplexer provides an interface for up to 48 full duplexed communication lines and is field expandable. It operates at speeds up to 4.8 kilobauds. Twelve different input/output speeds can be internixed. Byte size, stop bit and line rates are software selectable for each line. The synchronous modem controller operates at speeds up to 10 kilobauds.

This basic hardware is also available as a powerful Front-End Multiplexer with computer interface. Let's communicate. Call or write.

See the new Concentrator/Front-End Multiplexer in operation at the Fall Joint Computer Conference. Also, the TEMPO I modular computer system which starts at \$14,000 and develops with four separate options to a multi-processing, multi-programming Geliethi! EXHIBIT NO. 8908-8909.

Some plain talk about communications processing

Historically, computers have been viewed as automatic devices for numeric computation or volume data processing, and advances in computer technology have almost exclusively involved increases in these capabilities.

Today digital computers are faster and more powerful than ever. But the technology of data collection and dissemination has not kept pace.

Because of the urgency of much of the information processed by the computer it is essential that it respond within a time frame that its results can be meaningfully utilized. And so it has become vital to transmit input data directly from its source to the computer and output data directly to its destination. Furthermore, in order to economically distribute the power of a large scale computing system, or to effectively utilize the inherent value of a centralized data bank, it has become necessary to communicate directly and simultaneously with many geographically remote areas.

To meet these demands the computer came to be used not only as a computational device in the traditional sense, but as a device for the control of the communications network itself.

In order to perform this function, of course, a portion of the computer's time was required. But to the extent that a computer performs communications and control processing, its capacity to perform its conventional computation and data handling tasks is diminished. More importantly, the real loss in having the central computer handle communications and control processing is that it was not designed for these purposes; often its capabilities can be adapted to

such uses only in a cumbersome manner (for instance, it may not have the proper character handling instructions), or it has expensive capabilities which cannot be effectively utilized (floating point instructions, for example).

Here's what it means in dollars and cents . . . if you have a \$1 million computer, and 30% of its capacity is taken up with communications processing (in many systems the percentage is much higher), you really have a \$300,000 communications processor.

That's an expensive piece of hardware, to say nothing of the complex and equally expensive operating system required to control it. An internally programmed communications and control processor specifically designed for those applications is a superior — and less expensive — way to go.

The CC-70 Programmed Buffered Multiplexer, first member of a new family of communications processing systems being introduced by Computer Communications is specifically designed for real-time communications and control applications. It does a better job than the central computer. And it does it far more economically.

The CC-70 relieves your central computer of the high overhead tasks associated with line handling, polling, queuing, and message assembly.

Under stored program control, the CC-70 can handle multiple lines of varying speed — and transmission characteristics in the same system. Line adapters are offered for all standard data sets, full or half-duplex, synchronous or asynchronous, at speeds from 110 bps to 50,000 bps and higher.

Hardware modularity and program flexibility are central to the design of the CC-70. Its line handling capability can be increased on a plug-in module basis. Memory banks of 8K bytes each can be added up to 64K bytes. Peripherals and additional processing units can also be easily added.

The CC-70 comes complete with line handling and central processor interface programs, making it the most flexible communications handler around. And, unlike most communications processing systems, standard computer channel interfaces are available to tie the CC-70 to most popular computer mainframes, including the IBM System/360 and 1130 computers, the CDC 3000/6000 series, and the XDS Sigma series.

We'll be demonstrating the powerful capabilities of the CC-70 at the Fall Joint Computer Conference. You can see it there, or write Computer Communications for detailed information.



The CC-701 Communications/Control Processor, central element for the CC-70 Programmed Buffered Multiplexer



Computer Communications, Inc.

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Inglewood, California 90301
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7:58 AM
The Measure Men



Improvement through direct measurement.
That's what Boole & Babbage is all about.

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We measure hardware performance.
We sell proprietary products and contract services that are designed to measure and improve systems throughput.

Whatever you need — standard measurement products, special measurements, or measurement services — you can find it at Boole & Babbage.

We make systems measurement techniques a normal, operating tool.

That's how we got started. That's how we got our name. George Boole and Charles Babbage took the measure of data processing one hundred years ago.

Boole & Babbage. The Measure Men.

7:58 am 10:01 am 10:06 am



That's the time to start installing a Boole & Babbage product. 7:58 a.m. Check them out. The Boole & Babbage measure men start the day at 7:58. Just a little bit ahead of anyone else in the field.

A typical product installation cycle might take three days. Depending on the system, a little more or a little less. But figure on three days. It starts with a client conference, a description of procedures, problem programs, hardware configuration — and moves rapidly into the computer room.



That mini-tepe contains the Systems Measurement Software. The Extractors and the Analyzers for both software and hardware are on that tepe.



These are the JCL cards. That gets the system into the job stream. Meanwhile, the SMS/360 products are being copied from tape to disc (or other random access device).

The rest of the day is probably spent extracting data on program and configuration use. In measuring programs, the Extractor shares the same partition as the problem program, sampling data at set intervals. OS — or DOS — just thinks it's another job.

The samples pulled by the Extractor are written on to one of the system's discs or other devices. At the close of the day, that's about all that's happened. Early returns on some of the problem programs — or configuration uses — are in. Waiting to be analyzed.

7:58 am



Morning, again, and there's a Boole & Babbage analyst holding a disc pack. (Just because we asked him to.) That's where the product ultimately resides and either there — or on some other medium — is where the extracted data lies.

8:14 am



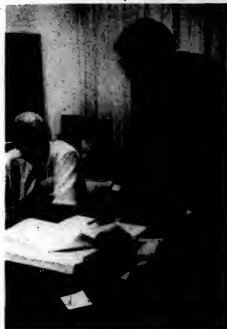
Now the Analyzer goes to work, acting something like a Measurement Report Generator. The Analyzer pulls together all the extracted data, performs statistical and data reduction operations and prints out a performance report. (If you'd like to see what one looks like, drop us a line. We'll send you one for software and one for hardware.)

11:21 am



The Boole & Babbage analysts are on their way back to their offices for review and reporting on product operations.

7:58 am



On the third day, Boole & Babbage go over initial findings and recommendations with the systems manager. Potential savings, bottlenecks and applications.

2:13 pm



The aim of this review — and follow-on training of customer staff — is to build familiarity with SMS/360 capabilities.

From now on, this customer will be getting monthly technical bulletins featuring product applications, new techniques and on-going product improvements.

He can run the product continuously against his problem programs or extract and analyze hardware performance data with equal ease.

That's SMS/360 — one of the Boole & Babbage measurement products. It's available for OS and DOS. Similar products will soon be available for MP 65 and Spectra 70. Everywhere.

On the fourth day...first reactions.

"Reprogram those statements. 70% of execution time takes place in less than 1% of the program..."

"This nested DO loop costs me 70% of the run. Let's modify it to compute and store..."

"The CPU's busy only 15% of the time. What's wrong..."

"Look into that SYSRES activity. Device 130 is overloaded..."

"Let's use these code execution diagrams for our programmer training program..."

"We can save 40% of the run time by making these four SVC's resident..."

"Data sets need reorganization. Look at these head movement reports..."

These are the kind of comments you'll be making about all your production programs and new development activities.

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The Measure Men.

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Glassware Product Labels Are Presorted, Recorded, Printed With Aid of Computer



Labels for thousands of cartons of glassware are computerized to save time for Indiana Glass Co.

DAYTON, Ohio — Time-saving label production for Indiana Glass Co. has been realized through a system utilizing a special form and a slitter unit.

The system increases both speed and efficiency for shipping Indiana Glass products — automobile headlights and gift, florist, interior and industrial glassware — according to Duane Anderson, company controller.

Daily, thousands of cartons of glassware must be labeled as orders are picked from warehouse stock and made ready for shipping by the truckload or carload, Anderson said. A computerized picking list with each order summarizes items and

quantities and lists them in warehouse location sequence for picking efficiency.

Preparing labels for the cartons was a bottleneck, Anderson said. Originally the company used duplicating masters, but these required too much hand-sorting. Then the job was put on the unit record system — still time-consuming, he said.

Anderson said the jam was broken when the company used the computer to presort label records and print the information on a special three-wide single-part form designed with the assistance of the Standard Register Co.

After labels are printed by the computer with basic order

data — date, consignee, order number, consignee department number, "ship to" and item information — they go to a Standard Register power slitter, Anderson said. The unit slits the continuous form into three separate, continuous webs.

The webs are merged, one on top of another, and fed directly into a Standard Register Selectronic buster. This operation breaks each set of three forms at the perforation turning them into individual labels. A sequence stacker of the buster insures that the burst labels are in correct order before being sent on to the warehouse.

The system handles label production and processing.

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- All delivered within 90 days!

Sound good? Hear the VM-1400 by calling this toll-free number anytime day or night: 800-523-2724. Our "hear it now" girl will tell it like it is. From Pennsylvania Call 609/665-4910 Collect

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November 12, 1969.

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Unbundling—Four and a Half Months Later

Software Marketplace Reflects Realignment of Users

By Phyllis Higgins

CW West Coast Bureau

"The marketplace is changing. There's more publicity for software, more of it around. Unbundling is here, more data processing people have to view software as a cost item," said Peter Van Meter, director of software marketing for National Computing Industries, Phoenix.

NCI recently chalked up a record sales month for new software by obtaining 22 sales and 11 letters of intent in its pre-announcement, pre-promotion push for its \$22,500 Work Ten package. NCI immediately revised its forecast of sales for the first year of Work Ten upward from 100 to 200.

Dr. Walter Bauer, president of Informatics Inc., echoed Van Meter's comments. "The unbundling announcement had everybody mesmerized through May to July. Users were not making up their minds. About two months after the announcement, the flood gates were opened."

Informatics' Mark IV is one of the industry's sales leaders. Over 200 sales have been made in 19 months. It carries a price tag of \$35,000 to \$42,500, with more options in the works.

IBM Enters Market

It's significant that IBM's first proprietary software announcement was the General Information System. GIS is competitive

with Mark IV and is priced at \$18,000 a year, lease only.

In addition, there is new education for multiple installations within the same organization. Mark IV offers reductions to a multiple user and on a short term lease has a rental price of \$1,250 a month.

Others Feel No Impact

Richard Jones, president of Applied Data Research, Princeton, N.J., and plaintiff in an antitrust suit against IBM over its "free" software, said his organization would feel no impact from the unbundling announcement.

"The programs IBM offers competitively to our Autolflow are still given to the user. Our

problem is that we have to convince the customer to even look at our program."

Autolflow appears to be the top software leader in the industry. In two and a half years, 850 installations of the \$6,300 package have been made.

"We haven't been as successful as we should have been. There are 20,000 customers out there. That's why we're using IBM," Jones said.

ADR recently announced a new package, Autolflow Librarian, a source program maintenance program, and made 20 sales in the first month. The package costs \$2,100.

Also boasting of record sales is Computing Efficiency Inc., Deer Park, N.Y. In its first four months of marketing Computer I, a program that checks daily on the efficiency of a computer center's operation and programming, it received more than 130 orders. The program sells for \$2,500 to \$3,000.

"The only thing available before was IBM's IN/OUT, and it gave us a way to measure the performance of the center. We find most users don't believe what we're telling them. Their reaction is, 'I need it. I believe it will work.' We give them a 30-day trial period and that takes care of the problem," said Donald Lees, president.

"I'm From Missouri!"

The "show me" reaction of users was commented upon by all four companies. NCI helps

solve it by also offering a 30-day trial period. This is not considered a prodigy evaluation period, but a proof-of-performance period.

ADR also offers a 30-day trial but believes that by referring the prospect to other users of their programs, the "show me" problem is eased.

Informatics is firmly against the 30-day plan and offers instead a short-term lease. The firm also notes the user's concern for who else has bought the system as an important sales element.

Mark IV boasts that of Fortune's list of the top 100 corporations, it has Mark IV systems installed in 30 of them, with 11 of them in the top 20.

Few Commercial Successes

Commenting on why there are so few strong commercial successes among software products, Bauer said, "Most of them aren't real products. They're computer programs that someone wants to sell."

"We find that users place a great deal of emphasis on support and reliability. They do extensive reference checking and investigating the accuracy of checks. We now have very elaborate testing routines. I didn't think this would have come about a few years ago."

Bauer has estimated that the program products market will grow from \$10 million in 1968, to \$2 billion in 1975, and up to \$5 billion in 1980.

Complete Printed Order Confirmation Within Seconds Claimed for 'Ordermatic'

NEW YORK — Hornbower & Weeks-Hemphill, Noyes says it is the first brokerage firm in the nation with a computer system that delivers a complete printed confirmation of an order within seconds after it is transacted on the floor of the New York Stock Exchange.

The new Hornbower system completes the automated cycle with its virtually instant printed confirmation — a complete invoice with price, taxes and commission.

Known as Ordermatic, the new multi-million dollar communications system was developed jointly over the last 24 months by Hornbower and Control Data Corp. Industry experts call

it a breakthrough in a total systems approach to ease the paperwork backlog that has plagued securities markets for so long.

Operation

When an order is submitted, a verification system programs into the computer checks over 100 possibilities of error. Any discrepancies are noted and corrected by the computer, if necessary by reaching by the point of origin.

For instance, if a Los Angeles order for 100 shares of IBM is directed by a clerk to the American Stock Exchange, the computer would automatically redirect it to the Big Board.

The verified order is sped directly to the floor. Elapsed time of an average order from the originating office to the floor, including checking for errors by the computer, is 5.2 seconds.

Following execution of the trade, the transaction is re-processed into the system, matched up automatically with the original order, verified for accuracy and flashed back to the originating office where a complete confirmation is printed out.

Elapsed time for this operation is just 60 seconds.

Printout Consumes Time

Most of these 60 seconds is consumed by the teletypewriter printout of the following detailed information: the customer's name and address, Social Security number, the number of shares bought or sold, price per share, trade and due dates, gross amount of the transaction, interest, and federal taxes, registration fee, commission, and the net amount.

With Ordermatic a Hornbower registered representative can discover in seconds the status of a margin account of any of his customers as of the previous night's close.

In addition, the new system stores in its memory bank up-to-the-minute research opinions on stocks, municipal bonds and mutual funds which Hornbower analysts follow closely.

Should there be a significant development affecting any one of these companies, the current report is flagged immediately.

Heart of the new system consists of two huge Control Data series 3300s at the Hornbower automation center at 110 Wall Street.

The computers are linked directly to the exchange floor, to the firm's headquarters at 8 Hanover Street, and 63 branch offices by a nationwide private wire network.

Informatics Shows Profit Two Months During Half

SHERMAN OAKS, Calif. — Informatics Inc. says it resumed profitable operations in August, but that losses incurred during the previous four months of fiscal 1970 resulted in a net loss of \$170,000 on revenues of \$90,000 for the six months ended Sept. 30, compared with net earnings of \$23,000 on revenues of \$4,762,000 for the like period a year ago, as adjusted for pooled interests of acquired companies.

Dr. Walter F. Bauer, president, said, "Operating results for the second quarter were below objective, largely because losses in recently acquired data centers were greater than anticipated."

"We have made substantial progress in cutting costs and stabilizing revenues in our data centers," he added, "and expect to continue improving operations."

"Sales of Informatics' Mark IV software products have increased substantially," Bauer said, "and we are very optimistic about the contributions of these products to both near and longer term profits."

On a share basis, the loss amounts to 12 cents per share on 1,466,000 average shares outstanding, compared with net earnings of 19 cents per share on 1,245,000 shares outstanding last year.

Bauer also reported that a new product line, Informatic Communication System (ICS-5), will be developed and marketed jointly by Informatics and Xerox. Data Systems under a previously announced agreement in principle between the two companies.

IBM Declares Dividend

ARMONK, N.Y. — Directors of IBM have declared a regular quarterly cash dividend of \$1 a share on common stock, payable Dec. 10, 1969, to holders of record Nov. 13, 1969.

Sears Seeks Major Portion Of Computer Usage Stock

CHICAGO — Sears, Roebuck & Co. has agreed in principle to acquire a majority interest in the Computer Usage Co., a major software firm.

Sears would exchange 0.3 share of its common stock for each share of Computer Usage's \$45,000 common shares outstanding.

The agreement would not obligate Sears to accept for exchange less than 65% nor more than 81% of the outstanding common shares of Computer Usage. If 81% were tendered, the transaction would be valued at about \$14 million.

The exchange would be taxable so that Computer Usage holders making the exchange would realize a gain or loss for federal income tax purposes unless 80% of the outstanding Computer Usage shares are tendered, Sears said.

The offer to Computer Usage holders will be made by prospectus to be furnished after the registration statement becomes effective in January.

Sears netted \$415 million on sales of \$8.3 billion last year. Computer Usage lost \$485,000 on sales of \$13,609,000.

Computer Usage will operate as a unit of Allstate Enterprises Inc., a Sears subsidiary engaged in auto financing, fire insurance, and protection, and which operates a motor club, a savings and loan association, and a mutual fund.

NCR Chalks Up Best Month On Centuries

DAYTON, Ohio — NCR has chalked up a new monthly record for incoming computer orders, according to G.P. Williamson, assistant vice-president, EDP products.

A total of 176 NCR Century Series computers were ordered in the U.S. during September, Williamson said, representing a sales value of almost \$30 million. Of the 176 systems, 124 were Century 100s and 52 were Century 200s.

Typically all major types of users were included in the sales picture," Williamson said, "with one in every three orders repre-

(Continued on Page 94)

Contracts

Jet Propulsion Laboratories has awarded a one-year contract to Computer Umge Co., Inc. to provide computer programming support in the area of management information applications. Under the \$357,000 contract, CUC will design, code, and implement new business and management information applications.

Under a \$1.8-million contract, Computer Sciences International is developing the programs for the London airport cargo electronic data processing scheme (Laces) to serve London's Heathrow Airport. International Computers Ltd. is supplying the computers for the automated system that provides inventory control

and customs clearance of international air cargo.

Amper Corp. has received a contract for approximately \$480,000 from PRD Electronics to supply Model ATM-13-11 digital tape memories for airborne avionics testing by the U.S. Navy. The Amper tape memories will be incorporated in PRD systems developed for the Navy's AN/USM-247 versatile avionics shop test (Vast) program.

Computer Data Systems, Inc. will provide computer technical services to the U.S. Post Office Department under a Basic Ordering Agreement for \$20,000. CDS's services entail computer

programming and technical documentation in support of the national air and surface schemes system (Nass), a computerized scheduling and mail routing system that optimizes the movement of mail pouches throughout North America.

Under a one-year \$70,000 software contract from the National Institutes of Health, Information and Communications Applications Inc. will assist the program analysis branch, chemotherapy, National Cancer Institute, in extending its clinical data processing system to include collection, storage, and retrieval of additional items of data on patients under the care of the leukemia service of NCI.

Century Geophysical Corp.'s century systems division has received a \$72,400 contract for the design and fabrication of Apollo active dosimetry systems. The contract is sponsored by Nass and AMD, and monitored by the Air Force Weapons Laboratory, Kirtland Air Force Base, N.M. The system contains devices to measure the radiation environment that Apollo astronauts are exposed to during space missions.

Applied Dynamics Inc. will install a four analog/hybrid system at Oak Ridge National Laboratory, operated by Union Carbide Corp., Nuclear Division, for the U.S. Atomic Energy Commission. Under the \$296,000 contract, Applied Dynamics will implement the complete system integration of an Applied Dynamics/100-volt analog/hybrid computer and a Union Carbide-supplied DEC PDP-10 digital data processor.

New Registrations

INTERNATIONAL COMPUTING CORP., 8200 Boulevard East, N. Bergen, N.J. 07047, a company that proposes to provide com-

puter accounting services on a time-sharing remote batch basis to hospitals, nursing homes, and clinics and also proposes to market and sell computer services design and programming services for the adaptation of such customers' existing manual account procedures to the company's computerized accounting system, filed to register 300,000 shares of common stock. Proceeds, at \$3 per share, intended for a computer center, for development of software packages suitable for use by medical institutions and the medical profession for nursing and training techniques and marketing staff; for general administrative staff; for working capital, and for general corporate purposes. The underwriter is Charles E. Doherty & Co., 200 Park Ave., New York.

COMPUTER GRAPHICS SYSTEMS CORP., 7530 San Fernando Road, Sun Valley, Calif., a company that designs, develops, produces and markets automatic digital plotting systems, numerically controlled plotting tools, and related equipment, filed to register 100,000 shares of common stock. Proceeds, at \$10 per share, intended for inventory, for additions to the manufacturing plant and equipment; for initiation of a marketing program and sale promotional activity for working capital; and for general corporate purposes. The underwriter is Martin & Co., 121 Mystic Ave., Medford, Mass.

DATA RECOGNITION CORP., 905 Industrial Ave., Palo Alto, Calif., 94303, a company engaged in research, development, manufacturing, and marketing of special-purpose optical character recognition systems, filed to register 150,000 shares of common stock. Proceeds intended for research and development, equipment purchases, operating expenses, and working capital. No underwriter is involved.

HOSPITAL COMPUTER APPLICATIONS, INC., 777 Northern Blvd., Great Neck, N.Y., a company that proposes to engage in the business of providing computer sharing services for hospitals and other commercial customers, filed to register 100,000 shares of common stock. Proceeds, at \$7.50 per share, intended for certain start-up costs, development of other systems for specific hospitals; development of systems for magazine subscription fulfillment; accounting, billing, and inventory systems for the above industry; addition to the company's general fund, and for general corporate purposes. The underwriter is Security Options Corp., 40 Exchange Place, New York, N.Y.

WESTCOM COMPUTER UTILITIES, INC., 463 7th Ave., New York, N.Y. 10018, a company that proposes to operate electronic data processing, service bureau, programming, and medium-size businesses with access to computerized business techniques and applications, filed to register 100,000 shares of common stock. Proceeds, at \$7 per share, intended for use in connection with the company's data center, for general and administrative expenses; for the company's general fund, and for general corporate purposes. The underwriter is Scott, Gorman, O'Donnell & Co., Inc., 50 Broadway, New York, N.Y. 10004.

METRO COMPUTER SERVICES, INC., 1608 New Haven Ave., Melbourne, Fla., a company organized for the purpose of providing data processing and data services to municipalities, filed to register 245,000 shares of common stock. Proceeds, at \$1.50 per share, intended for the company's general fund, and for general corporate purposes. The underwriter is Alpha Securities, Inc., 433 S. Grove St., Freeport, N.Y.



See 1920 characters at Booth 33005 at the Sahara.

The ATC Data Display Terminal has character capacity twice that of most other units. One version is interchangeable with IBM display terminals. Other versions are compatible with the hardware of most existing computers. Cursive stroke character generation and a highly sophisticated deflection system make it an exceptionally easy to read terminal.

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emerging enterprises

New Advanced Technology Corporation Is Announced

CUPERTINO, Calif. — The Rolm Corporation, a new advanced technology company, is planning to serve both industrial and government customers by producing a line of high-quality electronic products and by performing contract work in the area of applied research.

The firm's president and one of its founders, Dr. M. Kenneth Oshman, has announced a licensing agreement with Data General Corp., Southboro, Mass., giving the Rolm Corporation exclusive rights to manufacture a severe environment version of Data General's general purpose digital computer, the Nova.

"We believe that producing a severe environment version of the Nova will help Rolm Corp. enter the industrial and government markets initially with a strong product that is known and accepted," Oshman said.

Rolm expects to announce full technical specifications for the militarized Nova this month. Initial deliveries of production models are planned for February, 1970.

It is expected that the single quantity price including 4K 16-bit words of wide temperature magnetic core memory will be less than \$20,000, according to Oshman.

Rolm Corp. is headquartered in Valco Industrial Park in Cupertino and presently has eight employees. Now in temporary quarters in the Valco Shopping Center, the company will occupy 10,000-sq-ft of offices and production facilities in a building under construction in the industrial park. Employment is expected to reach a level of 75 by July, 1970, Oshman said. The company is privately held.

Other New Companies

• Delta Systems Corp., a new Chicago area professional consulting organization, has been established to assist corporations and professional associations in the design and implementation of computer based information systems.

President and chief executive officer of the corporations is Theodore A. Youngdahl.

Youngdahl is an officer in an affiliated company, Delta Computer Utility, Inc., a computer facility providing on-line interactive computer services to business.

Both companies have their principal offices at Edens Executive Center in Wilmette.

• Jackson Associates of Columbus, Ohio has entered the computer process control field.

Specializing in control systems for the power utility and chemical industries, this activity will endeavor to bridge the gap between computer and peripheral equipment manufacturers and plant engineering, providing a painless transition for the oper-

ating management, from computer technology to factory output.

• Computer Complex, Inc. of Houston-Texas, and Advanced Patent Technology, Inc. of Las Vegas have formed a joint venture company, Optim, Inc.

Optim, Inc. will devote its efforts to the design and manufacture of a new and advanced type of time-shared computer.

CDC Organizes Resale Systems Division

MINNEAPOLIS — Control Data Corp. has organized a resale systems division to support the remarketing of small and medium-scale CDC computers that are traded in by customers buying newer, larger systems.

The new division, with James Murdakes, a long-time CDC associate as general manager, will be headquartered in St. Paul, Minn. It will be operated in the same manner as the company's standard systems management and product management functions.

Each computer system selected for resale will be completely refurbished and warranted equivalent to the company's standard contractual warranty terms, according to a company spokesman.

The Control Data resale com-

puters include the 3200, 3400, 3600 and 3800 systems. Also, two of CDC's earliest systems, the 160-A and 1604, which continue in demand, will also be remarketed.

Other New Subsidiaries

• Computer Machinery Corp. of Los Angeles will form Computer Machinery Corp. International to manufacture and market its products throughout the world.

Initial plans call for subsidiaries in the United Kingdom, France, and Germany to be formed under the aegis of Computer Machinery Corp. International.

• Data Products Corp., Los Angeles, has formed Data Products Trading Corp. to widen the

scope of its international marketing activities and to enter new geographic areas, particularly the eastern block countries.

George M. Herzfeld has been named president and managing director of the new company which will operate under U.S. Department of Commerce regulations.

• Cox Data Systems Co., Atlanta, Ga., will operate as a division of Cox Broadcasting Corp. Cox Data will develop software packages for the broadcasting, cable television, and trade publishing industries. These packages will be used in providing data processing services to customers of the Atlanta data center, as well as additional data centers which are expected to be in operation by 1971.

the computer industry's first key-to-disc data input system

accepts the output from 60 or more
key stations simultaneously

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Time-shared logic cuts data preparation costs 50%.

Now you can cut your computer input costs in half. This new innovation in data preparation techniques gives you two money-saving advantages over conventional keypunch or one-key-board/one-magnetic-tape-per-operator systems: (1) The LC-720 employs a computer time-shared input; (2) it is the only system available that provides data output directly on IBM/360 compatible magnetic disc.

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Data entered into the LC-720 is processed by a small digital computer and stored on an IBM/

360 compatible magnetic disc that provides the advantages of bulk storage and high speed random access of data. The problems associated with punched-card handling or the mounting, pooling, merging and unmounting of magnetic tape reels are eliminated. All data is conveniently and economically stored in an IBM 1316 disc pack for direct high speed input to your modern data processing system. Naturally, an IBM/360 compatible magnetic tape is also provided with the system as standard equipment.

The LC-720 KeyDisc System also offers for the first time, data verification requiring one input pass only through the system, in addition to the normal technique of verification requiring two different operators. Record size is infinitely variable by each operator from 1 to 120 characters long and the system stores a large library of 30 or more different format control programs, all available simultaneously to any and all operators.

LC-720 KeyDisc System

Bring your own data for a demonstration

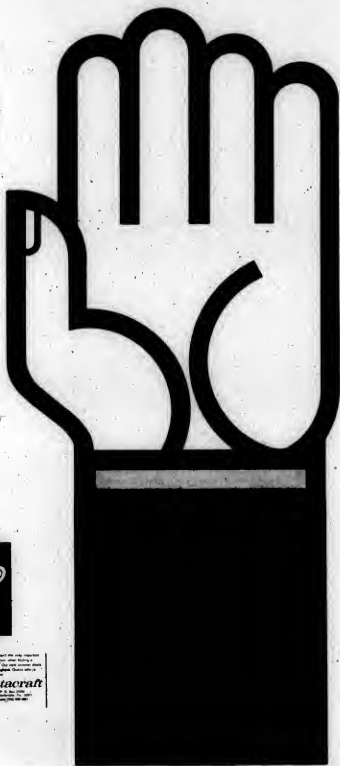
Logic Corporation invites you to see an operating demonstration of the LC-720 KeyDisc System at the company's premises. Bring your own original data and Logic will provide a reel of magnetic tape of the output of your data from the LC-720 for later printout at your own computer facility.

To arrange for a demonstration, contact Gary Tischler, Director of Marketing (201) 334-3713

LOGIC CORPORATION

15 E. Euclid Ave., Hasbrouck, N.J. 08033 (609) 426-6626





DATA-CRAFT'S FIRST SEMINAR ON HOW TO BUY A COMPUTER



(There are eight seminars in this series.)

Computer users in New York City will be the first to hear the seminar on how to buy a computer. The seminar will be held on November 18 at the New York Sheraton Hotel.

Topics for the seminar include: How to select a computer system; How to select a computer system; How to select a computer system.

Approximately 100 seats are available for the seminar. For more information, contact Data-Craft at (212) 633-1000.

Data-Craft

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DATA-CRAFT'S SECOND SEMINAR ON HOW TO BUY A COMPUTER



(There are eight seminars in this series.)

Throughput is a key factor in selecting a computer system. This seminar will discuss the factors involved in selecting a computer system.

Topics for the seminar include: How to select a computer system; How to select a computer system; How to select a computer system.

Approximately 100 seats are available for the seminar. For more information, contact Data-Craft at (212) 633-1000.

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DATAcraft's THIRD SEMINAR ON HOW TO BUY A COMPUTER



(There are eight seminars in this series)

What can you expect to learn from this seminar? You will learn the basic concepts of computer systems, the various types of computers available, and the factors that influence the selection of a computer system. You will also learn how to evaluate the performance of a computer system and how to negotiate the purchase of a computer system.

What is a computer? A computer is a device that can store and process information. It can be used to perform a wide variety of tasks, from simple calculations to complex data processing. The seminar will cover the basic concepts of computer systems, the various types of computers available, and the factors that influence the selection of a computer system.

Datacraft

1000 N. 1st St., Suite 100
Miami, Florida 33132
Phone: 366-1000

DATAcraft's FOURTH SEMINAR ON HOW TO BUY A COMPUTER



(There are eight seminars in this series)

What can you expect to learn from this seminar? You will learn the basic concepts of software, the various types of software available, and the factors that influence the selection of a software system. You will also learn how to evaluate the performance of a software system and how to negotiate the purchase of a software system.

What is software? Software is a set of instructions that tell a computer how to perform a task. It can be used to perform a wide variety of tasks, from simple calculations to complex data processing. The seminar will cover the basic concepts of software, the various types of software available, and the factors that influence the selection of a software system.

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DATAcraft's FIFTH SEMINAR ON HOW TO BUY A COMPUTER



(There are eight seminars in this series)

What can you expect to learn from this seminar? You will learn the basic concepts of priority interrupt systems, the various types of priority interrupt systems available, and the factors that influence the selection of a priority interrupt system. You will also learn how to evaluate the performance of a priority interrupt system and how to negotiate the purchase of a priority interrupt system.

What is a priority interrupt system? A priority interrupt system is a system that allows a computer to respond to a high-priority interrupt before it has finished processing a low-priority interrupt. The seminar will cover the basic concepts of priority interrupt systems, the various types of priority interrupt systems available, and the factors that influence the selection of a priority interrupt system.

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rupt

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Fall Joint Computer Conference

Datacraft

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Ft. Lauderdale, Florida 33307.
Phone (305) 933-2651.

Orders and Installations

An RCA Spectra 70/35 has been ordered by Central Washington State College for use in administrative data processing. Areas covered with the new system will include registration, accounting, library, budgeting, and space analysis.

International Telephone and Telegraph has installed a GE-416 information system at its semiconductor division in West Palm Beach, Fla. The system includes a central processor with a 16K memory, card punch, card reader, printer, magnetic tape controller, and six magnetic tape handlers.

Redcor Corp. has been selected by General Dynamics/Convair to

supply an RC 70 system to the GDC San Diego plant. Features of the system include an 8K memory with an 860 nsec cycle time, memory parity, memory protect, hardware index register, and power fail safe.

Ten computerized reservations systems will be delivered to Pan American Airways from Applied Data Research Inc. The system - Panstar - will be able to predict personnel requirements for the handling of reservation calls on a real-time basis.

One hundred Super Valu Stores in the Midwest will receive Monarch Marking Systems' Rotomark systems designed to speed and simplify the handling

of order entries. Each system consists of the scanner, an electronic interface for a magnetic tape recorder, and a printer to make the encoded labels.

The municipal government of Tijuana, Mexico, is installing a National Cash Register Century 100 to handle control of income and expenses for the local government.

The Australian Department of Civil Aviation has ordered an International Computers Ltd. System 4-70 valued at about \$1.25 million. In addition to its accounting and simulation functions, the system will provide management information and mathematical calculations associated with engineering design.

A Lockheed Information system for health-care services will be used at Temple University Hospital, Philadelphia. The system will handle routine business office work and will provide information relative to services for patients.

The following organizations have ordered or installed Univac 9000 series systems: Truacraft Fabrics Inc., Salisbury, Pa., a Univac 9200 for use in inventory control, sales analysis, general accounting, and payroll processing; Lombard Street, Inc., a New York brokerage house, a Univac 9200 for general accounting, sales analysis and processing paperwork; American Parts

System Inc., Omaha, Neb., and Interstate Milk Producers Cooperative Inc., Philadelphia, Univac 9200s; and Union College, Lincoln, Neb., a Univac 9200 II for use in student education and business applications.

An Atlanta, Ga., construction firm, the Pinkerton and Laws Co., will install a GE-115 disk system to provide job-cost analysis and immediate job status inquiry. Applications include payroll, general accounting, and critical path analysis.

Scan-Data Corp. has delivered a Model 100 graphic arts page reader to R.R. Donnelley & Sons Co., a Chicago commercial printer. Donnelley's system is said to read telephone directories in three type sizes and in type faces ranging from light to bold with up to 12 lines to the inch. It also reads full 80-character, upper and lower case QCR-B fonts.

Computer Micrographics will use its FR-80 computer output microfilm recorder, worth \$225,000, to create a half-million film frames a month and make distribution copies from them that will run in excess of 12 million pages a month. Information International manufactures the recorder.

Hughes Aircraft Co. has installed a CDC 1700 system for real-time design, evaluation, and checkout of spacecraft digital control and telemetry systems. The system is supported by Control Data Corp. 1500 series analog-to-digital conversion equipment that enables linking of the computer to laboratory instruments or directly to prototypes being tested.

Atlantic Software Inc. and Programming Methods Inc. have received orders for the Score information and retrieval and reporting system from Lees Carpent, division of Burlington Industries, the U.S. Department of Agriculture, and the U.S. Department of Housing & Urban Development.

Hewlett-Packard, Cupertino division, and Varian Associates of Palo Alto and Varian Data Machines have ordered high-speed paper tape perforators from Tally Corp. The perforators will be used as data output recording devices for computers and data logging systems.

Computer Complex Inc. of Houston will expand its time-sharing system with the addition of a \$1-million SDS 940.

Tempo, GE's Center for Advanced Studies in Santa Barbara, Calif., has installed a large-scale GE-615 information system. Tempo is a long-range planning and interdisciplinary study organization that uses the GE-615 for business and scientific applications developed by GE.

Computer Instruction Inc. has installed a GE-255 in its Dallas headquarters. CI's computer-sharing service specializes in providing packaged computer courses to supplement classroom instruction.

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| <input type="checkbox"/> Nov. 13 Des Moines, Iowa | <input type="checkbox"/> Nov. 25 Washington, D.C. | <input type="checkbox"/> Jan. 14 Baltimore, Md. |
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| <input type="checkbox"/> Nov. 17 Detroit, Mich. | <input type="checkbox"/> Dec. 3 Boston, Mass. | <input type="checkbox"/> Jan. 20 Jacksonville, Fla. |
| <input type="checkbox"/> Nov. 18 Cleveland, Ohio | <input type="checkbox"/> Dec. 4 Pittsburgh, Pa. | <input type="checkbox"/> Jan. 21 Miami, Fla. |
| <input type="checkbox"/> Nov. 19 Manchester, N.H. | <input type="checkbox"/> Dec. 9 Dallas, Tex. | <input type="checkbox"/> Jan. 22 San Francisco, Calif. |
| <input type="checkbox"/> Nov. 20 Hartford, Conn. | <input type="checkbox"/> Dec. 10 Houston, Tex. | <input type="checkbox"/> Jan. 23 Philadelphia, Pa. |

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☐ We prefer to attend a seminar in _____ or _____ Advise us accordingly.

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Atlantic Software Inc.

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Even though we've already delivered a working prototype to a customer, we insist upon delaying the official "presentation" of Computer Industries' Model 300 Microfilm Printer/Plotter until you can watch a production model in action at the FJCC in Las Vegas.

Although we won't let you have an advance peek, we have no objection to letting the world know that the CII 300:

- Is a modular unit that both prints & plots.
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If this sounds like the most flexible answer to your COM requirements, you're right. And you'll be completely sold when you see the Model 300 spell it out for you.

There are a lot more things to say about Computer Industries' most recent addition to its broad line of computer graphics equipment, but why not see it all for yourself—in person. As our Chief Engineer says, "If one picture is worth 2,000 words, one demonstration is worth 10,000 pictures." (If you can't make it to the FJCC, drop us a note and we'll be glad to send you literature or arrange for a representative to call.)

*The Model 300 can produce
10,000 pictures in less than one hour!



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Fully portable, the Model 75 is light-weight, noiseless and can be operated on either AC or DC current. It encodes ASCII on 1/4" magnetic tape at 250 BPI with a 100 character video display of five, 20 character, lines and helps step the operator through the program by means of a cursor position indicator on the video display.

You can buy this inexpensive genius outright, or, you can lease it for just a few dollars a month.

Test drive the new numeric or alpha-numeric Model 75 at your office or at the Fall Joint Computer Conference in Las Vegas. We're in booth 4316.

DI

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Acquisitions

Interface Systems, Inc., Ann Arbor, Mich., has negotiated an agreement in principle to acquire Statistical Analysts, Inc., a Detroit-based computer service firm. Completion of the acquisition is subject to the approval of the board of directors of Interface Systems, Inc. and the stockholders of Statistical Analysts, Inc. Interface Systems offers a professional service to help clients design and implement computer software.

General Signal Corp., New York, has entered the EDP field through the acquisition of an 80% interest in Decision Concepts, Inc., with headquarters in New York. General Signal Corp. is a producer of control systems and components for water and waste treatment, transportation control systems, building systems, and hydraulic applications. Decision Concepts, Inc. will provide planning, design, and management services in systems analysis and evaluation, programming, installation, supervision, and facility management of computer-based or punched card data processing systems.

Allstate Investment Corp., Newport News, Va., has agreed in principle to acquire privately owned Software Methods, Inc., New York, for an undisclosed amount of Allstate stock. Software Methods is a consultant and programming company serving industry, education, and government through the selection and utilization of data processing hardware.

Diversified Data Services and Sciences Inc., New York, has acquired the Bethesda, Md., facilities of Strategic Datacenters, Inc. The new division offers feasibility studies for computer applications; computer program design, coding, testing, and documentation; equipment evaluation and selection studies; computer facility operation and management under contract to the client; keypunch and key verifying; the sale of computer time under either a batch process or a telecommunications environment; and proprietary programmed packages for sale or lease.

Computerology, Inc. has disclosed two additional pending acquisitions: R.H. Montgomery & Co., a data processing center in Woodbridge, Conn., and Cole (Burton Latimer) Holdings, Ltd., a large manufacturer of men's high-style shoes in England. Montgomery will be combined with Computerology's operation in Waterbury, Conn. The Montgomery acquisition is for stock and a small amount of cash, while the Cole acquisition is for cash. The purchase price was not disclosed in either case. Computerology operates EDP centers in Philadelphia, Mt. Kisco, N.Y., and Waterbury, Conn.

Re-Con Systems Corp., New York, has acquired all of the issued and outstanding stock of Scholarship Search Corp. from Mandate Systems, Inc., New York. The purchase was made for an undisclosed amount of cash, plus an option on a small

number of shares of Re-Con common stock. Scholarship Search, a New York corporation, uses the computer to match high school graduates, college students, and returning military veterans with scholarships, fellowships, grants, and student loans.

International Systems Associates, Ltd., New York, a data processing firm, has signed a letter of intent, subject to the execution of definitive agreements, for the acquisition of Fulfillment Associates, Farmingdale, N.Y. Fulfillment Associates is a subscription fulfillment service.

General Instrument Corp. of Neptune, N.J., has announced

the acquisition of Nore Electric Co., Ltd. of Essex, England, manufacturers of miniature automotive lamps and gaseous discharge noise sources.

Information and Communication Applications, Silver Spring, Md., has acquired Key Punching Services, Pennington Gap, Va., for an exchange of stock. The latter firm will become the data entry systems division of ICA and will enable ICA to provide total facilities management service in data processing and data communications for government and industry.

Numerical Control Education & Consulting, Inc., Philadelphia, which provides computer-assisted manufacturing services

including consulting, education and training, and tape preparation for numerically controlled machine tools, has agreed in principle to acquire Escos Corp., with headquarters in Los Angeles, for an undisclosed amount of common stock. The transaction is subject to execution of a definitive agreement. Escos Corp. is a national technical services organization providing in-plant engineering design, and drafting services, including the supply of engineering subcontract personnel primarily to the aerospace, electronics, and nuclear industries.

Tracor Computing Corp., with headquarters in Dallas, has reached an agreement in prin-

ciple to acquire Insurance Information Exchange, Inc., also of Dallas, a computer software company. Tracor offers a full range of computing capabilities, including hardware product development, and specializes in systems and facilities management services under which TCC takes total responsibility for a customer's computing requirements.

Unionamerica Computer Corp., a subsidiary of Unionamerica, Inc., has signed a definitive agreement to acquire United Computing Corp. of Redondo Beach, Calif., for an undisclosed purchase price. United Computing is a computer software services and products company.



Courier announces Executerm I

Designed for the Time Sharing Computer User

Here is the data entry and retrieval terminal designed and engineered specifically for the needs of the time sharing computer user. In addition to being fully teletype compatible, the Executerm I offers the following exclusive features:

1. Variable Split Screen
2. Non-Destructive Cursor
3. Conversation or Edit Mode
4. Page Roll

And the cost is amazingly low.

For further details on the operation, applications, and installation plans of the Executerm I write or call our Marketing Department.



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COMPUTERWORLD

expansions

GE's Information Devices Get 25% Space Increase

OKLAHOMA CITY, Okla. — GE's information devices department (IDD) expanded its manufacturing facilities here by 25% with the recent opening of a new \$6 million building.

The addition gives IDD a total of 433,000-sq-ft of space for the designing, manufacturing, and marketing of data communications subsystems and computer peripheral equipment in Oklahoma City. The department's

line of products include document handling equipment, card readers, optical font readers, terminals, and memory devices.

The new building serves as the department's management headquarters. It also houses marketing and other office functions, in addition to fabrication, painting and plating facilities.

It is part of GE's information systems equipment division.

NEW YORK — The new Elgin data processing center, marking the debut of the company's computer-based information system, has been dedicated.

The data center at 450 W. 33rd Street is under the direction of Elgin National Data Services, Inc., a subsidiary of the parent company, and links Elgin's divisions through a network of terminals.

Elgin National Industries, Inc., is a major supplier of time products, appliances, and leisure and home entertainment products for the consumer market, and provides specialized engineering and construction services, scientific equipment, and other products for industry.

Elgin is planning to market data processing services to other consumer products-oriented

users who desire to incorporate advanced programming and system skill as part of their company's operations.

Frank F. Schmeier, director of information services, explained that visual display terminals, linked to a central IBM 360/40, flash data on a television screen, providing Elgin management with information on the company's 45,000 accounts.

This data will include gross and net sales for each division; inventory control; sales by marketing area; account, product, and salesman; number of unfilled orders for each product; credit information on each account and file location for all paper records of that account; and accounts receivable.

In expediting procedures with dealers, when a retailer's order

form is received at headquarters, it is matched with account information stored in the computer. Terminal operators make a visual comparison of the actual bill and invoice statement data that is flashed on the terminal's screen.

Information stored in the Model 40 also will be available to personnel in the company's 12 warehouses. Using an IBM 2740 terminal with a writer-style keyboard, warehouse employees can keep corporate and division headquarters apprised of the status of inventory and shipments.

Pica Establishes Graphic Arts Computer Center

NEW YORK — Printing Industry Computer Associates, Inc. (Pica) of Princeton, N.J., has established a graphic arts computer center at 25 W. 26th St. here. According to a company spokesman, the new facility is part of a general expansion program undertaken to provide local availability in key graphic arts centers of Pica's computerized services for printers and publishers.

The company's services include: printing management information systems (PMIS) which offers printers daily computerized analysis of costs related to work in process, as well as detailed analysis of production, sales, and profits; and Ultra-X, a universal computer language for typographers interfacing with the IBM 360 computer.

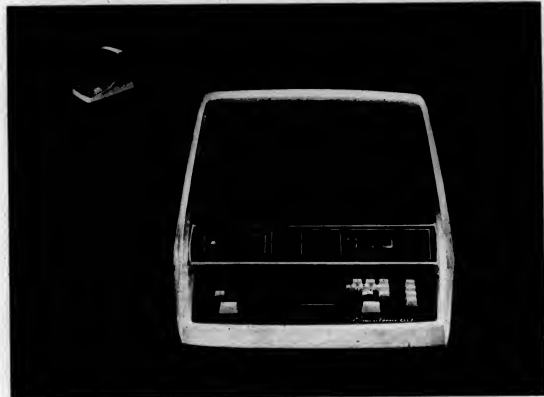
The new 5,000-sq-ft facility is said to encompass an IBM 360/40 computer, plus input, output, and peripheral equipment, designed to provide even the smaller printer with profits-increasing PMIS analysis reports of his operations, generally at less than the cost of a single clerical employee.

Other Expansions

Sperry Rand Corp.'s Univac federal systems division has announced plans for major expansion of its facilities in the St. Paul-Minneapolis area. Construction is expected to begin in the spring of 1970, with occupancy in mid-1971. The new 350,000-sq-ft manufacturing and engineering building will be located at Univac Park in Eagan township.

Peripheral Equipment Corp. has broken ground for its new facility in Chatsworth, Calif. The new PEC building will comprise more than 75,000-sq-ft of administrative, engineering, and manufacturing space. PEC is a manufacturer of a full line of synchronous and incremental magnetic tape transports for the computer industry.

National Data Processing is moving its corporate headquarters from Cedar Rapids, Iowa, to the Chicago area. A growing list of clients and the need for improved air transportation facilities were cited as reasons for the move. National Data Processing is the developer and marketer of the ILA family of data processing systems, specially designed for the insurance industry. Its new location is at 821 Commerce Drive, Oak Brook, Ill.



Courier Announces The IBM Compatible *Executerm 60* for the IBM System 360 Computer User



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Courier also produces the Executerm I for the time sharing computer user. For further details on the operation, applications, and installation plans of the Executerm 60 and the Executerm I, write or call our Marketing Department.

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Control Data's Earnings Increase 16% But Stockholders React Negatively

By A.B. Williams

CW staff writer

MINNEAPOLIS — Control Data Corp. said that third quarter earnings were up about 16%, from 71 cents to 83 cents per share.

This was in line with, but slightly under, results for the first six months.

The full nine-months report showed a gain of about 19%, from \$2.23 to \$2.66 per share. The third quarter showed some interesting breakdowns. For the quarter, sales were up 28%, to \$137,49,000, but within the gross figure, outright sales rose by nearly 40% (to \$96,028,000), with rentals and service income up only 7%, to \$41,121,000.

Gross margins have been quite stable, within a few tenths of 31%. One significant change has been a steady rise in the ratio of "interest and other deductions" to sales. From 2.9% in the first nine months of 1968, it has gone up to 5.0% in the quarter just ended.

Disappointment Shown

The last quarter appeared to be disappointing to the holders of a large number of shares of CDC stock. The low, reached the day after the statement was made public, was 119-3/8, down 25-1/4 from the previous Friday's closing price.

During the four days in which the major part of the drop occurred, trading volume was high; in point of fact, during the Tuesday, Wednesday, Thursday,

and Friday in question, over 1,300 shares of CDC were traded.

This was by far the highest activity of any issue during the four days, and represented 9% of outstanding CDC stock.

A sharp drop such as this indicates that the announced results appeared disappointing to a number of stockholders, and presumably to some security analysts.

It appears to raise questions about whether the company had lost any booked business, or suffered any stretchouts.

This kind of question is par-

ticularly relevant to the fortunes of a company such as CDC; the ultimate source of much of its volume is funding at various government levels, with considerable federal involvement.

When asked specifically whether cancellations or stretchouts had affected reported sales and earnings negatively, a CDC spokesman denied the rumors, both generally and with reference to several contracts which were mentioned in some of the conjectures.

He further stated that orders were strong, and mentioned several in the larger systems area.



Century Orders

Score Top Month

(Continued from Page 83)
senting replacement of competitive machines."

The previous best month for Century sales was last March, when 118 orders were recorded.

Williamson said production of the Century Series is accelerating rapidly. A production rate of 100 systems a month will be reached by the end of the year.

Demand for the Century Series since its introduction last year has brought a major expansion at the company's electronics division facilities. Under construction at San Diego is a separate 100,000-sq-ft building plus a 120,000-sq-ft enlargement of an existing structure.

These additions will boost the total size of the plant to more than half a million square feet.

Large expansions also have been carried out at the division's facilities in suburban Los Angeles.

Employment in the electronics division has more than doubled since the Century Series was introduced and now totals 5,000 persons.

This does not include marketing or technical service personnel associated with the Century series program.

Card readers, printers, and various other peripheral units for NCR Century systems are made at the company's Dayton plant.

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Rixon Electronics, Inc.
a subsidiary of Data Communications Corporation
2120 Industrial Parkway, Silver Spring, Maryland 20904
Phone 301-653-5351

COMPUTER STOCKS: TRADING SUMMARY

Week Ended October 31, 1968

COMPUTER SYSTEMS					
1949 EXCH. RANK	CLOSING PRICE		WEEK NET CHANGE	WEEK NET CHANGE	
N 147-130	158 1/8	BURROUGHS COMP	+ 1 7/8	-4 3/8	
N 69-38	49	CIGALIS RABIN	- 8 7/8	-6 1/8	
N 135-11	116 3/4	CONTROL DATA CORP	+ 1 1/8	-1 1/8	
N 43-54	86 3/4	DIGITAL EQUIPMENT	- 1 1/8	-1 1/8	
N 135-11	116 3/4	CONTROL DATA CORP	+ 1 1/8	-1 1/8	
N 98-81	84 1/8	GENERAL ELECTRIC	+ 8 1/8	-1 3/8	
N 118-75	108	HEWLETT-PACKARD CORP	+ 3/8	-3 1/8	
N 118-75	108	HEWLETT-PACKARD CORP	+ 3/8	-3 1/8	
N 385-391	340 1/8	INTERNET INC	+ 3 1/8	-9 1/8	
N 147-130	158 1/8	BURROUGHS COMP	+ 1 7/8	-4 3/8	
N 43-54	86 3/4	DIGITAL EQUIPMENT	- 1 1/8	-1 1/8	
N 135-11	116 3/4	CONTROL DATA CORP	+ 1 1/8	-1 1/8	
N 98-81	84 1/8	GENERAL ELECTRIC	+ 8 1/8	-1 3/8	
N 118-75	108	HEWLETT-PACKARD CORP	+ 3/8	-3 1/8	
N 385-391	340 1/8	INTERNET INC	+ 3 1/8	-9 1/8	
N 147-130	158 1/8	BURROUGHS COMP	+ 1 7/8	-4 3/8	
N 43-54	86 3/4	DIGITAL EQUIPMENT	- 1 1/8	-1 1/8	
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N 385-391	340 1/8	INTERNET INC	+ 3 1/8	-9 1/8	
N 147-130	158 1/8	BURROUGHS COMP	+ 1 7/8	-4 3/8	
N 43-54	86 3/4	DIGITAL EQUIPMENT	- 1 1/8	-1 1/8	
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N 118-75	108	HEWLETT-PACKARD CORP	+ 3/8	-3 1/8	
N 385-391	340 1/8	INTERNET INC	+ 3 1/8	-9 1/8	
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N 98-81	84 1/8	GENERAL ELECTRIC	+ 8 1/8	-1 3/8	
N 118-75	108	HEWLETT-PACKARD CORP	+ 3/8	-3 1/8	
N 385-391	340 1/8	INTERNET INC	+		

PERIPHERALS & SUBSYSTEMS				WEEK	WEEK
1969	CLOSING			NEW	OLD
EXCH	RANGE	PRICE		CHG	CHG
H	85-59	14 1/4	ADDRESSOGRAPH-CHALTE	+ 3/4	-4.00
H	71-13	14 1/4	ALPHATECH	+ 1 1/2	7.00
H	50-18	14 1/4	ALPHATECH	+ 1 1/2	1.00
H	19-10	14 1/4	BM, ZENKEMER & NEW	+ 1 1/2	1.00
H	31-16	14 3/8	ROMBERG-RAND	+ 1 1/2	-7.00
A	31-16	14 3/8	CALCOMP	+ 1 1/2	-4.00
H	38-14	14 1/2	COMINTHECS	+ 1 1/2	-7.00
H	12-17	14 1/2	COMINTHECS	+ 1 1/2	-4.00
H	67-10	17 7/8	DATA PRODUCTS CORP	+ 1 1/2	-7.00
H	67-10	17 7/8	DATA PRODUCTS CORP	+ 1 1/2	-7.00
A	60-01	18	ELECTRONIC NEMURIC	+ 1 1/2	-8.00
H	37-13	18 7/8	FABRICE	+ 1 1/2	-8.00
H	31-13	18 7/8	INFORMATION SYS	+ 1 1/2	-8.00
H	01-10	18 1/4	INFORMATION SYS	+ 1 1/2	10.00
H	10-10	18 1/4	INFORMATION SYS	+ 1 1/2	10.00
A	89-19	16 1/4	NUMON DATA SCLP	+ 1 1/2	-5.00
H	31-18	16 1/4	NUMON DATA SCLP	+ 1 1/2	-5.00
H	31-18	16 1/4	PROTECH	+ 1 1/2	-4.00
H	81-22	39 3/4	PETER INSTRUMENT	+ 3 3/4	-8.00
H	76-54	39 3/4	PETER INSTRUMENT	+ 3 3/4	-8.00
H	81-22	39 3/4	SPANNERS ASSOCIATES	+ 3 3/4	-6.00
H	76-54	39 3/4	SPANNERS ASSOCIATES	+ 3 3/4	-6.00
H	36-16	18	TALLY CORP	+ 1 1/2	-10.00
H	11-55	18 1/2	VENOX CORP	+ 1 1/2	-8.00

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SOFTWARE & RDP SERVICES					
EXCHN	1969 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK HIGH
R	14 - 5	1	ADVANCED COMP TECH	1/16	-6.67
A	19 - 6	23 5/8	ARIES	1/16	-3.00
A	10 - 12	8 1/2	AMERICAN DATA PRS	1/4	-3.00
R	15 - 17	15	AUTOMATIC SCIENCES	2	15.38
A	10 - 12	7 1/8	COMPUSYS	1/16	-6.66
A	91 - 9	14 1/8	COMPUTER AMP	3/16	-5.88
A	10 - 12	18 3/4	COMPUTER DESIGN	1/16	-6.66
H	20 - 19	14	COMPUTER MATHN	1/16	-6.66
A	64 - 37	40	COMPUTER SERVICE	3/16	-6.05
A	17 - 6	11 1/4	DATA SERVICE	1/16	-6.66
A	17 - 6	11 1/4	DATASAT	1/4	-5.37
A	15 - 9	12 1/2	DATASTAT	1/16	-18.37
R	30 - 18	13 1/2	DATA COMP PRG	1/16	-6.66
R	30 - 18	13 1/2	DEBITER	1/16	-6.66
A	91 - 4	10	HAYES READER	3/16	-7.46
A	91 - 4	10	PC COMP ANALYST	1/16	-6.85
A	91 - 4	10	PERFORMING & SYS	1/16	-6.85
A	10 - 3	4	SOFTWARE SYSTEMS	1/16	-6.88
A	10 - 3	4	STRATEGIC INC	1/16	-6.88
A	28 - 11	19	TDS COMP CENT INC	3/4	-5.42
A	10 - 3	4	UNIVERSITY COMP	3/16	-6.88
H	55 - 56	54 1/2	UNIVERSITY COMP	3/16	-6.88
A	10 - 3	4	US SYSTEMS	1/16	-5.66
A	10 - 3	4	USLS-TIME-SHARING	1/16	-5.66

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Viewpoint on Information Services

Information Services' Explosive Growth Points to Marketing Needs for Future

NEW YORK — "The information services business is undergoing explosive growth right now, yet from our position we're beginning to see what's in the future for us and our competitors," said Paul W. Sage, general manager of GE's information services division, at a meeting of financial analysts held recently in New York.

Since 1965, time-sharing has expanded from a \$10 million business to a \$150 million business. By 1973 it will reach \$1 billion and perhaps double that by 1975, he said.

Factors Affecting Business

Sage said several factors effect the information services business

● First, Sage said, putting together what can be called the "critical mass" of this business requires high capital investment. There are high fixed costs for computer equipment, peripherals, facilities, and lines of communication.

In addition to their expense, these items require an investment lead time considerably in advance of any realization of increased revenue.

● The second factor has been the high technology content of these services. "Time-sharing systems must provide users with not only the service they need and expect, but also flexibility in language and programs," he added.

Reliability Requirements

- Third, the reliability requirement of such a system is high. "We have reached the conclusion," Sage said, "that it will be very difficult for a single computer and its peripherals to meet the future reliability require-

He explained that if a company has an in-house system available 95% of the time, the machine is down 10 hours out of a 200

He applied this rate to a time-shared system. If there are 30 users at any time in the month, then the 200 hours for the company system becomes 10,000 hours for the on-line system. There are now 500 unserved hours and "that's bad news."

"That's why we have devoted a substantial effort to systems engineering to provide the necessary redundant access control

processing, and file capability," Sege said.

• The last factor is the highly competitive nature of the business and its effects on the marketplace. Today there are over 150 competitors and some 300 computer systems in the field. As a result, computer time without programming and service enhancement has undergone price erosion.

The number of competitors has also brought about a sifting out of the smaller, specialized houses from the broadly diversified larger firms, he added.

Mejor Mercados

Sage defined four major segments in the information services market and roughly classi-

• The scientific market segment has had good performance to date, he said, but will level out in the seventies. This market is the largest current user of time-sharing and remote-batch services.

"It is easiest to serve with current technology," Sage explained, "yet because this segment is highly sophisticated and is more interested in raw power than program libraries and service, this segment will both cause and react quickly to price erosion."

● The applications-oriented segment of the market is in the relatively early stages of development, but is rapidly gaining momentum.

- **Data base-oriented services** have a good initial growth pattern and will continue to grow, Sage believes. Reservation services and similar activities fit into this area.

Plans for Growth

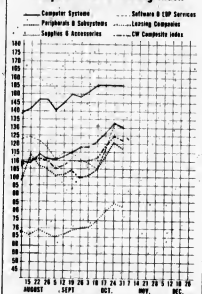
Sege stated that current technologies are adequate for today's needs, but improved file size, reliability, and cost will be necessary to meet the projected

"In a marketing sense, [the business] will have to create a greater awareness of the benefits and uses for data bases if it is to realize growth and increased revenue from this particular segment," he added.

● General business is potentially the major market opportunity for network information services, Sage believes. Twenty percent of the market will be made up of medium- and large-scale

The other 80% will come from the provision of generalized data processing services to small business. To serve this segment properly, large technological advances in general purpose software, field support techniques, terminals, communications, and data storage will also be necessary, he said.

Beyond the technical improvements needed to capture the bulk of this segment, Sage stated, a good deal of success throughout the business will depend on its ability to inform the market of their needs and of the benefits of on-line services.



"Computer Pooh-Poohers like you are Fast Becoming Extinct. HAI!"

Earnings Reports

LMC DATA INC.

Six Months Ended Aug. 31
 1969 1968
 Revenue \$1,937,477 ...
 Loss 158,515 ...

a-Includes operations of Esco Packers & Supply Co., acquired on a pooling-of-interest basis in May, 1969. b-Esco was a privately held company and no interim figures were available.

COMPUTER COMMUNICATIONS

Three Months Ended Sept. 30
 1969 1968

Shr. Earnings \$1.10 ...
 Revenue 2,290,793 1,138,798
 Earnings (Loss) 116,892 (\$7,353)

a-Related for acquisition of General Fabrication Corp. and Wesco Industries.

trial, Inc., on a pooling-of-interest basis.

CONRAC CORP.

Nine Months Ended Sept. 30
 1969 1968

Shr. Earnings \$1.11 5.82
 Revenue 39,154,733 36,509,080
 Earnings 1,512,832 1,111,695

COMPUTER SCIENCES CORP.

13 Weeks Ended Sept. 26
 1969 1968

aShr. Earnings 8.22 c\$1.2
 Revenue 22,006,000 17,392,000
 Spec. Cred. 387,000 387,000
 Earnings 2,646,000 01,839,000
 26 Week Shr. 4.4 2.30
 Revenue 40,446,000 31,826,000
 Spec. Cred. 387,000 387,000
 Earnings 5,285,000 02,819,000

a-Based on income before special credit; b-Equal to 15 cents a share in

the 13 weeks and 23 cents a share in the 26 week period; c-Adjusted to reflect five-for-two stock split in June, 1968.

LECTRO COMPUTER LEASING

Three Months Ended Sept. 30
 1969 1968

Shr. Earnings 8.10 8.05
 Revenue 250,597 121,693
 Earnings 36,620 15,672
 9 Mo Shr. 30 .07
 Revenue 612,603 169,288
 Earnings 105,806 22,548

XEROX CORP.

Three Months Ended Sept. 30
 1969 1968

Shr. Earnings 8.52 05.42
 Revenue 305,926,069 254,746,569
 Earnings 40,214,219 31,930,445
 9 Mo Shr. 1.51 01.21
 Revenue 872,504,737 92,220,785
 Earnings 116,522,761 92,220,785

a-Based on income before special credit.

a-Includes results of Xerox Data Systems, acquired May 16, 1969; b-Adjusted for a three-for-one stock split in May, 1968.

MADJAC DATA CO., INC.

Six Months Ended June 30
 1969 1968

Shr. Earnings 8.06 6.01
 Revenue 197,416 34,394
 Earnings 23,983 3,277

BOOTHE COMPUTER CORP.

Three Months Ended Sept. 30
 1969 1968

Shr. Earnings 8.37 8.28
 Revenue 9,847,300 5,583,891
 Earnings 633,718 411,161
 9 Mo Shr. 1.21 .51
 Revenue 28,433,064 10,189,879
 Earnings 1,927,721 600,482

a-Based on income before special credit.

credit; b-Restated to reflect a change in accounting procedures; c-Tax loss carry-forward; d-Equal to 58 cents a share and 52 cents a share on a fully diluted basis; e-On a fully diluted basis per share earnings were 33 cents in 1968 and 48 cents in 1969 quarter and \$1.10 and 48 cents respectively in nine month period.

CSI COMPUTER SYSTEMS INC.

Six Months Ended Aug. 31
 1969 1968

Revenue \$469,880 \$232,000
 Loss \$7,510 \$56,000

ITEL CORP.

Three Months Ended Sept. 30
 1969 1968

Shr. Earnings 8.23 8.10
 Revenue 11,111,000 2,844,000
 Earnings 877,000 30,000
 9 Mo Shr. .62 .30

Revenue 28,526,008 4,282,000
 Earnings (Loss) 2,370,000 (160,000)

SANDERS ASSOCIATES INC.

Year Ended July 31
 1969 1968

aShr. Earnings 8.87 \$1.30
 Revenue 187,122,000 193,284,000
 Spec. Chgs. \$5,897,000 ...
 Earnings (Loss) (1,951,000) 6,183,000

a-Based on income before special charges; b-Includes provision for settlement of a heavy contract dispute and contract cost adjustments and provisions, primarily relating to three other military contracts.

ELECTRONIC MEMORIES

Nine Months Ended Sept. 27
 1969 1968

bShr. Earnings \$1.26 8.84
 Revenue 61,480,000 48,971,000
 Earnings 3,618,000 2,824,000

a-Based on acquisitions on a pooling-of-interest basis. Pro forma share earnings, assuming full dilution, as reported by company, were \$1.25 in 1969 and 83 cents in 1968.

WANG LABORATORIES, INC.

Three Months Ended Sept. 30
 1969 1968

Shr. Earnings 8.24 8.19
 Revenue 5,466,228 4,368,337
 Earnings 457,188 370,228

BECKMAN INSTRUMENTS, INC.

Three Months Ended Sept. 30
 1969 1968

Shr. Earnings 8.25 8.20
 Revenue 31,640,546 30,425,309
 Earnings 875,411 876,648

AUTOMATION SCIENCES, INC.

Year Ended July 31
 1969 1968

Shr. Earnings 8.29 8.18
 Revenue 2,351,312 1,727,201
 Earnings 623,424 355,057

TELEX CORP.

Three Months Ended Sept. 30
 1969 1968

aShr. Earnings 8.54 8.24
 Revenue 13,096,895 9,103,904
 Earnings 1,065,675 448,818
 9 Mo Shr. .95 .35
 Revenue 22,555,965 15,169,045
 Earnings 1,836,749 644,165

a-Based on common and common share equivalents. Per share earnings on a fully diluted basis, assuming conversion of subordinated convertible debentures, as reported by company, were 51 cents in the quarter and 89 cents in the six months, compared with 23 cents and 34 cents, respectively, in the like 1968 periods.

OPTICAL SCANNING CORP.

Three Months Ended Sept. 30
 1969 1968

aShr. Earnings 8.24 8.32
 Revenue 2,475,512 2,195,129
 bTax Cred. 7,500 9,400
 cEarnings 136,175 178,620

a-Based on income before tax credit; b-From tax loss carry-forward; c-Equal to 26 cents a share in 1969 and 34 cents a share in 1968.

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Meet our Corporate staff: Ham Hawkins, Tom Gilroy, Gordon Utt, Bob Wigger, and Jerry Hummel in Las Vegas, November 18-20, 1969, Suite 1523, Caesar's Palace. Or write to: N. H. Hawkins, President—Vendere International Marketing Corp., Wells Fargo Bank Building, Suite 225, Del Amo Financial Center, Torrance, California 90503.

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VENDERE

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9-Month UCC Revenues Double Last Year

DALLAS - University Computing Co. reported that revenues and net income for the first nine months of 1969 were about double the results for the comparable period last year.

Redcon Reports After-Tax Loss For 1st Quarter

CANOGA PARK, Calif. - Redcon Corp. reported an after-tax loss of \$17,900 for the three-month period ending Sept. 29, 1969, compared to a loss of \$26,100 in the first quarter of the prior fiscal year. Sales for the quarter increased to \$1,858,000 from \$1,330,400 last year.

In announcing quarterly results for the first time, Emil R. Borgers, president, stated that a shift to larger orders with longer delivery cycles was the primary cause of the loss. "Orders for the company's computer-based systems have increased substantially and manufacturing expansion is currently in process," he said.

Borgers recently announced that a contract has been awarded to Redcon to manufacture and deliver an additional 100 PCA KeyLogic Systems to Pentac Computer Associates, New York.

The contract value is in excess of \$10 million.

Borgers said that Pentac's KeyLogic contract is the most significant order in Redcon's history. Each KeyLogic System includes Redcon's RC 70 "mini" computer, standard peripherals, and custom manufactured KeyLogic terminals.

UCC net income for the nine months ending Sept. 30, 1969, after elimination of inter-company transactions and minority interests in publicly-owned subsidiaries, amounted to \$10,210,000, or \$1.80 per share on 5,980,000 average common and common equivalent shares outstanding.

Net income from computer operations was \$5,260,000. Revenues for the nine months amounted to \$85 million.

For comparison, net income for the first nine months of 1968, restated to include acquisitions made on a pooling-of-interest basis, amounted to \$4,820,000 on restated revenues of \$42 million, or 84 cents per share based on 5,670,000 average shares then outstanding.

UCC President Charles J. Wyly Jr. reported that the plan announced earlier to merge Computer Industries, Inc. and Computer Leasing Company into new wholly owned subsidiaries of UCC will be submitted to CII and CLC stockholders at separate special meetings called for December 3.

Computer Industries, Inc. represents the manufacturing function of UCC, and makes a range

of computer terminals and peripheral equipment at plants in California, Texas, Wyoming, and England.

Computer Industries reported earnings per share for the first nine months of 1969 up 50% over the like period last year.

Net income for the nine-month period ended Sept. 30, 1969 was \$1,070,800, or 27 cents per share on 4,223,431 average common and common equivalent shares outstanding. Revenues amounted to \$11,592,000. The results include the operations of Datal Corp. from March 25, 1969, its date of organization, to Sept. 30, 1968. CII acquired Datal in June, 1969, in a pooling-of-interest transaction from University Computing.

For comparison, CII net income for the first nine months of 1968 was \$608,000, or 18 cents per share on the 3,426,370 average shares then outstanding. Revenues for the 1968 period were \$7,346,000.

CII President Robert G. Dee noted that revenues and earnings for this year's first nine months exceeded the company's full-year results for 1968, which were \$11,227,000 in sales and \$930,000 in net income.

'Bas' Speeds Large-Block Trading By Matching Buy and Sell Orders

NEW YORK - The New York Stock Exchange's block automation system (Bas) will have subscribers in 13 major metropolitan areas across the country when it goes into operation at the turn of the year, the exchange has reported.

The exchange said that to date 174 subscribers had signed contracts to participate in the system. Fifty-five of those are investing institutions, including 18 of the nation's 20 largest banks.

The list of charter subscribers also includes some 119 member firms of the New York Stock Exchange.

Bas is designed to facilitate large-block trading on the exchange by matching buy and sell interests in NYSE-listed stocks through an exchange computer.

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To make imaginative and sophisticated use of a 360/30 system with one of the world's leading manufacturers of cranes and excavators. Located in Iowa's most progressive and fastest growing industrial city (population slightly over 100,000).

Helpful but not mandatory — exposure in manufacturing processing, a degree in business, mathematics, engineering or physical sciences. Mandatory — the ability to fill a challenging position, and to make creative and innovative contributions.

Top working conditions, plus full opportunity to further professional development. Salary open.

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ICC Embarks Upon Executive Overhaul

NEW YORK — International Computer Corp., (ICC) with executive offices at 99 Park Avenue, New York City, and administrative offices at the White Plains Plaza, One North Broadway, White Plains, N.Y., has announced executive changes.

Lester J. Tanner, formerly president of ICC, is now chairman of the board; Frederick M. Müller, formerly vice-president and director, becomes president and director; and Alan Barham moves up from vice-president and director to executive vice-president and director.

Four regional vice-presidents were elected: southern New England region, Alexander Day; northern New England region, Adolph Guido; eastern region, Steven Greenfield; and mid-

western region, Richard A. Lovell.

Other directors of the corporation are: Robert R. Vance, Stanley B. Dreyer and David M. Weinberg. Roy E. Tolan is treasurer, and Elizabeth Knapp is secretary.

ICC operates 14 wholly owned

subsidiary computer schools (Programming & Systems Institute) in the New England, Eastern and Midwestern regions.

ICC's software services division provides the computer user with such services as consulting, system design, programming, recruitment, and facilities management.

Guard, a Founder of Applied Logic, Is Elected President by Directors

PRINCETON, N.J. — James R. Guard, Ph.D., was elected president of Applied Logic Corp., Princeton, New Jersey, at a meeting of the board of directors.

Guard is a founder of Applied

Logic and helped conceive and build the company's time-sharing systems. He has served as a vice-president and director since 1962. Most recently, he directed the marketing division, where he combined his management and

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EDPeople

technical background to guide the development of services, products, and sales for the ALI/COM Time-Sharing Network.

Guard has served as an assistant professor on the faculty of Princeton University, where he earned his doctorate in mathematics in 1962. Most recently, he directed a visiting lecturer at Princeton.



James R. Guard



Man-Computer Interactive Systems

Lockheed is continuing to expand its efforts in interactive systems and has immediate openings in its research laboratory.

The company is a leader in research, development and implementation of computer-aided design, computer graphics and man-computer interactive systems.

Positions are available in design and research in interactive computer and data management systems. Six years programming experience with a bachelor's degree or three years' programming experience with an advanced degree is required. Knowledge of digital computer executive systems and interactive computing is desirable.

If you are interested in expanding your career in this field and would like to join in some very interesting work, write U. D. McDonald, Employment Manager, Lockheed-Georgia Company, Dept. 5611, 2363 Kingston Court S.E., Marietta, Georgia 30060. Lockheed is an equal opportunity employer.

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A Division of Lockheed Aircraft Corporation

Crandall Heads All Com-Share Divisions

ANN ARBOR, Mich. — Richard L. Crandall, executive vice-president of Com-Share, Inc., has been promoted to chief operating officer with full responsibility for the performance of all divisions of the corporation. In making the announcement, president Robert F. Guise Jr., said that the new appointment is a manifestation of Crandall's proven administrative and executive ability.

Crandall, one of the company's original founders, headed Com-Share's research and development activities since 1966 and was promoted to vice-president of research and development in the fall of 1967. In September of 1968, he was elected to the board of directors and promoted to executive vice-president in

charge of the technical division, which then included R & D, national operations, applications, and consulting. In June of 1969, Crandall assumed further responsibility for the marketing division. As a result of his new appointment, he also will be responsible for the operation of the administration division.

Guise said that with Crandall's promotion he himself will be able to devote full attention to long range planning and achieving the company's financial goals. The new organization, he said, will enable Com-Share to meet the challenging demands of today's time-sharing industry.

In addition, Com-Share stockholders elected two new members to the company's board of directors at their annual meeting. The new directors are Gordon E. Hod, president of WF Associates, Inc., St. Paul, Minn., and William E. Zimmie, president of W.E. Zimmie, Inc., Cleveland.

Reelected to the board were Com-Share president, Robert F. Guise Jr., Glenn V. Edmonson of the University of Michigan,

Stanley R. Day, an independent consultant in manufacturing services and investments, Richard L. Crandall, executive vice-president of Com-Share, and Harry Hodge, Com-Share secretary-treasurer.

Prior to the election of directors, stockholders voted to reduce the number of directors from nine to seven to form a more efficient working board.

Position Announcements

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SUBSCRIBE TO COMPUTERWORLD

McCain Will Lead UCC Product Lines Computer Services

DALLAS — E.W. McCain, a former Univac executive, has been named executive vice president, operations, for University Computing Co., according to UCC President Charles J. Wyly Jr.

In this position, Wyly said, McCain will be responsible for all UCC computer services and product lines.

Reporting directly to McCain will be these UCC computer services divisions and subsidiaries: Computer Utility Network, Data Link Division, Applied Science Group, UCC International, Inc., and UCC Development Division. The latter is a

EDPeople

newly formed division responsible for special systems hardware and sales activities.

Also reporting to McCain will be the Computer Products Group, including the Graphic Systems Division, Data Communication Systems Division, Data Corporation, Computer Instrumentation, Ltd.; Standard Computer Leasing Division, Government Services Division, and Customer Engineering Division. McCain joined UCC recently, after more than 11 years with Sperry Rand Corporation. His last position with Sperry Rand was vice president of marketing for its Univac Federal Systems Division, based in St. Paul, Minn. His responsibilities included both data processing marketing and defense systems marketing.

Prior to this, McCain was Southwest regional marketing manager for the Philadelphia-based Univac data processing division. He was headquartered in Houston.

McCain envisions his new position at UCC as "one of bringing to bear the total resources of the company on the diverse needs of the data processing field. UCC is a multi-function company in the computer industry, and in serving customers many of these functions are related."

ALL ROAD 8 LEAD TO ROMAC



Or if they don't all now, they soon will. Because at the rate we're growing, there'll be a Romac office in every major city. Frankly, our fast growth is unusual for the kind of work we do. Romac is a personnel consultant firm specializing in data processing, financial, and accounting people. Right now, we've got the 13 offices listed below in New England, New York, Atlanta, Baltimore, Los Angeles, and Washington, D.C. And, in a very short time, we'll be opening in Pittsburgh, Philadelphia, and other cities. And looking at us on a map, you'd think we were a franchise outfit. But that's what's unusual about Romac. We're a team, not a franchise. A group of Associates who can communicate with each other. And more important, people who can communicate with you. Having come from your ranks, we understand what you've done, what you've tried to do, what you hope to do. And if you can't do it where you are, we'd like to help you find a place where you can. Call us or visit our offices. After all, to find the right job, you have to go the right route from the beginning.

Via Romac.

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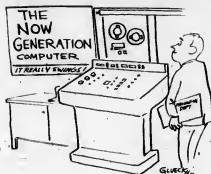
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"Look, I want you to get out there on the firing line and fight!"

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Honeywell Makes Management Moves

WELLESLEY HILLS, Mass. — Two major management promotions for Honeywell's EDP division based here have been announced by CW Spangle, the newly appointed vice-president and group executive of the computer and communications group.

Robert P. Henderson, marketing vice-president of the division since September, 1966, has been promoted to vice-president and general manager of the 11,400-person division, responsible for manufacturing and marketing the Honeywell Series 200 family of general-purpose business computer systems.

Christopher J. Lynch, director of marketing for the division since September, 1966, has been promoted to vice-president of marketing, succeeding Henderson. He will direct marketing, marketing support, and education activities of the division, which includes nearly 3,000 persons in sales offices in 80 major cities in the U.S.

Henderson joined Honeywell EDP in 1960 as a sales representative in New York City after three years as a computer salesman with IBM. He later served as branch sales manager for the Manhattan area and in 1963 was

named central regional sales director for a 10-state area in the Midwest. In early 1965, he was named director of field marketing with headquarters in Wellesley Hills.

Lynch was a computer salesman with IBM in the New York City area from 1956 until 1963 when he joined Honeywell EDP as a customer manager in the New York sales office.

Lynch was named as branch manager of the Chicago office in November, 1963, and as central regional sales director for a 10-state area in the Midwest, in January, 1965. Two years later, Lynch was appointed director of field marketing for the western section of the United States and was named director of marketing for all U.S. operations for the EDP division when the marketing operation was reorganized in February this year.

FRAMINGHAM, Mass. — Neil D. Morrison has been named vice-president in charge of computer operations, a newly created position; at Honeywell Inc.'s computer control division. He will be responsible for the division's computer engineering and manufacturing operations as well as for the manufacture of its digital product line, according

to T. Paul Bothwell, vice-president and general manager for the division.

For the past four years, Morrison has been director of computer operations for Honeywell in Europe, where he was responsible for manufacturing and engineering facilities at Newhouse, Scotland, and Heppenheim, Germany.

He is a member of the Institute of Electrical and Electronics Engineers, the Institute of Industrial Engineers, and several other professional societies.

Directors Recap

Robert W. Lear, president of Indian Head, Inc., has been elected to the board of directors of Brandon Applied Systems, Inc., New York.

Computer Audit Systems, Inc., E. Orange, N.J., has elected Dr. W. Thomas Porter Jr. as a member of its board of directors. Computer Audit specializes in services for the auditing profession, development of training programs in EDP auditing, creating software audit programs, and instruction/consulting services on computer security and protection.

Advance Data Corp., Philadelphia, has announced that Quentin G. Monte Jr. will serve as a member of the board of directors of the company, as well as being vice-president, secretary, Information Systems Corp., Washington, D.C., has announced the addition of the following to its board of directors: Robert Amory, Alan C. Kluger, and Charles Mackall. ISC provides computer software, time-sharing, systems analysis, and data processing services.

Oliver W. McCracken has been appointed to the board of directors of Carterfone Communications Corp., Dallas.

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NCI Elects R.V. Work President

BEDFORD, Mass. — Five executive appointments have been announced by Viatron.

Roger Phillips has been named president and Charles French vice-president of Viatron Computer Systems International Corp., the international division of Viatron Computer Systems Corp. The new division will be responsible for all marketing, manufacturing, service, and distribution of Viatron products outside the U.S.

Phillips will continue to serve

as vice-president for systems engineering operations. Both men were formerly managers of their respective operations.

Executive Corner

as vice-president and general counsel of Viatron Computer Systems Corp.

French was formerly manager of international marketing.

James Cannon, treasurer of Viatron Computer Systems Corp., has been given the additional responsibility as treasurer and vice-president of Viatron Programming, Inc., a wholly owned subsidiary engaged in contract programming, systems consulting, systems design, and general data processing sciences.

Two vice-presidents have been named in Viatron's technical organization. Laurence Drew has been named vice-president for microelectronic operations and John Terzian was appointed

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5,000th PDP-8 Installed By Digital Equipment Corp.

MAYNARD, Mass. — Digital Equipment Corp. says that the number of PDP-8 small computers installed recently passed the 5,000 mark.

DEC introduced the desk-top PDP-8 in May, 1965. This was followed by the less expensive PDP-8/S, and slightly more than a year and a half ago, by the integrated circuit successor to the PDP-8, the PDP-8/L.

In July, 1968, the PDP-8/L was

introduced to succeed the PDP-8/S.

Of the 5,000 PDP-8s now in use, more than 3,000 are the \$12,800 PDP-8/L and \$8,500 PDP-8/S. Sales of the PDP-8/L passed 1,500 less than 18 months after its introduction.

The company is considered to have been the first to offer a computer for less than \$30,000 when it introduced the PDP-5 in 1963.

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Trade Shorts

Plans have been announced to change the name of National Data Processing Corp. to Network Data Processing Corp. and to move the firm's executive headquarters and national sales offices from Cedar Rapids, Iowa, to the Chicago suburb of Oak Brook.

Robert H. Taylor, president, said the change in name would more accurately reflect the company's future activities in relation to the concept of integrated data processing networks.

Systems Leasing Corp., metropolitan Washington, D.C. head-quartered computer and computer peripheral equipment financing company, has been renamed Financial Analytica, Corp., and its operating subsidiary SLC Leasing Corp. renamed Finako, Inc.

Financial Analytica Corp. designs long-term financial plans for companies interested in optimizing their marketing and financial objectives. Organized in 1968, the corporation has designed both equipment and software leasing plans on a national scale with computer equipment manufacturers.

Southwestern Research Corp.'s research and development division has been renamed McCown

Laboratories, development division of Southwestern Research Corp.

The division was formed early in 1969 to develop products incorporating laser technologies. They include those designed for communications, data handling, recording, graphic arts, and process control.

At a meeting of the board of directors it was voted to change the corporate name of Construction Products, Inc., Natick, Mass., to data-site, Inc. The change was made to more clearly reflect the scope of operations of the company, whose principal business activity at present is site preparation for computer facilities.

Construction Products will continue in operation as a division of data-site, Inc. specializing in complete movable partition systems, acoustical ceilings, lighting, carpeting, and furniture for office and plant.

In order to avoid conflict with several organizations bearing closely related names, Universal Processing Corp., Roselle, N.J., has changed its name to Computar Corp.

The company, a specialist in the remanufacture and reconditioning of all types of EDP equipment, is a wholly owned subsidiary of Trailcor, Inc.

Sexton Supply Company has relocated and changed its name to Sexton Data Products, Inc., 5309 Edina Industrial Blvd., Edina, Minn.

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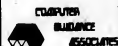
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